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Geo. W. Andrews

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PROCEEDINGS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

AT THE

Thirtieth Annual Meeting,

HELD AT NIAGARA FALLS, N. Y., SEPTEMBER, 1882.

ALSO THE

CONSTITUTION, BY-LAWS, AND ROLL OF MEMBERS.

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PHILADELPHIA:
SHERMAN & CO., PRINTERS.
1883.

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1892

Officers of the Association.

1882–83.

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Louis Dohme, ... Baltimore, Md.

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John M. Maisch, ... Philadelphia, Pa.

LOCAL SECRETARY.

Charles Becker, ... Washington, D. C.

REPORTER ON PROGRESS OF PHARMACY.

C. Lewis Diehl, ... Louisville, Ky.

Standing Committees.

Committee on Drug Market.

George W. Sloan (Chairman),	Indianapolis, Ind.
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W. H. Wickham,	New York, N. Y.
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Committee on Papers and Queries.

J. U. Lloyd (Chairman),	Cincinnati, O.
A. Mayell,	Cleveland, O.
W. W. Bartlett,	Boston, Mass.

Committee on Prize Essays.

C. Lewis Diehl (Chairman),	Louisville, Ky.
John F. Judge,	Cincinnati, O.
Emil Scheffer,	Louisville, Ky.

Committee on Legislation.

John M. Maisch (Chairman),	Philadelphia, Pa.
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John A. Milburn,	Washington, D. C.
Robert Cowdrey,	Chicago, Ill.

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T. Roberts Baker,	Richmond, Va.
Joseph S. Evans,	West Chester, Pa.

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W. J. M. Gordon (Chairman),	Cincinnati, O.
Charles Bullock,	Philadelphia, Pa.
William Saunders,	London, Ont.
E. H. Sargent,	Chicago, Ill.
E. Schellentrager,	Cleveland, O.

Council.

Members of the Council.

Term expires.		
1883.	THE OFFICERS OF THE ASSOCIATION, *ex officio.*	
"	JOSEPH P. REMINGTON,	Philadelphia, Pa.
"	GEORGE W. KENNEDY,	Pottsville, Pa.
"	HENRY J. MENNINGER,	Brooklyn, N. Y.
1884.	WILLIAM J. M. GORDON,	Cincinnati, O.
"	JOHN INGALLS,	Macon, Ga.
"	JOSEPH L. LEMBERGER,	Lebanon, Pa.
1885.	SAMUEL A. D. SHEPPARD,	Boston, Mass.
"	WILLIAM SAUNDERS,	London, Ont.
"	WILLIAM S. THOMPSON,	Washington, D. C.

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GEORGE W. KENNEDY, Secretary.

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	JOHN INGALLS,
	WILLIAM S. THOMPSON,
	WILLIAM B. BLANDING,
	THE TREASURER AND PERMANENT SECRETARY OF THE ASSOCIATION, *ex officio.*
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	JOSEPH L. LEMBERGER,
	HENRY J. MENNINGER.
On Publication:	JOSEPH P. REMINGTON, Chairman.
	C. LEWIS DIEHL,
	WILLIAM SAUNDERS,
	W. J. M. GORDON,
	JOHN M. MAISCH.
On Centennial Fund:	CHARLES A. HEINITSH, Chairman.
	S. A. D. SHEPPARD,
	JOHN M. MAISCH.

List of Officers of the Association,

SINCE ITS ORGANIZATION.

(Deceased in Italics.)

PRESIDENTS.

Daniel B. Smith,	Philadelphia,	1852–53
William A. Brewer,	Boston,	1853–54
William B. Chapman,	Cincinnati,	1854–55
John Meakim,	New York,	1855–56
George W. Andrews,	Baltimore,	1856–57
Charles Ellis,	Philadelphia,	1857–58
John L. Kidwell,	Georgetown, D. C.,	1858–59
Samuel M. Colcord,	Boston,	1859–60
Henry T. Kiersted,	New York,	1860–62
William Procter, Jr.,	Philadelphia,	1862–63
J. Faris Moore,	Baltimore,	1863–64
William J. M. Gordon,	Cincinnati,	1864–65
Henry W. Lincoln,	Boston,	1865–66
Frederick Stearns,	Detroit, Mich,	1866–67
John Milhau,	New York,	1867–68
Edward Parrish,	Philadelphia,	1868–69
Ezekiel H. Sargent,	Chicago,	1869–70
Richard H. Stabler,	Alexandria, Va.,	1870–71
Enno Sander,	St. Louis,	1871–72
Albert E. Ebert,	Chicago,	1872–73
John F. Hancock,	Baltimore,	1873–74
C. Lewis Diehl,	Louisville, Ky.,	1874–75
George F. H. Markoe,	Boston,	1875–76
Charles Bullock,	Philadelphia,	1876–77
William Saunders,	London, Ont.,	1877–78
Gustavus J. Luhn,	Charleston, S. C.,	1878–79
George W. Sloan,	Indianapolis, Ind.,	1879–80
James T. Shinn,	Philadelphia,	1880–81
P. Wendover Bedford,	New York,	1881–82
Charles A. Heinitsh,	Lancaster, Pa.,	1882–83

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John L. Kidwell,	Washington, D. C.,	1856–57
James Cooke,	Fredericksburg, Va.,	1857–58
Edward R. Squibb,	Brooklyn, N. Y.,	1858–59
William Procter, Jr.,	Philadelphia,	1859–60
William J. M. Gordon,	Cincinnati,	1860–62
John Milhau,	New York,	1862–63
John M. Maisch,	Philadelphia,	1863–64
Richard H. Stabler,	Alexandria, Va.,	1864–65
George C. Close,	Brooklyn, N. Y.,	1865–66
Edward Parrish,	Philadelphia,	1866–67
Robert J. Brown,	Leavenworth, Kan.,	1867–68
Ferris Bringhurst,	Wilmington, Del.,	1868–69
Ferdinand W. Sennewald,	St. Louis,	1869–70
Flemimg G. Grieve,	Milledgeville, Ga.,	1870–71
C. Lewis Diehl,	Louisville, Ky.,	1871–72
Samuel S. Garrigues,	East Saginaw, Mich.,	1872–73
William Saunders,	London, Ont.,	1873–74
Joseph Roberts,	Baltimore,	1874–75
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Samuel A. D. Sheppard,	Boston,	1876–77
Ewen McIntyre,	New York,	1877–78
Frederick T. Whiting,	Great Barrington, Mass.,	1878–79
T. Roberts Baker,	Richmond, Va.,	1879–80
George H. Schafer,	Fort Madison, Ia.,	1880–81
Emlen Painter,	San Francisco,	1881–82
John Ingalls,	Macon, Ga.,	1882–83

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John Meakim,	New York,	1854–55
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Frederick Stearns,	Detroit, Mich.,	1856–57
Samuel P. Peck,	Bennington, Vt.,	1857–58
James O'Gallagher,	St. Louis,	1858–59
Joseph Roberts,	Baltimore,	1859–60
William S. Thompson,	Baltimore,	1860–62
Eugene L. Massot,	St. Louis,	1862–63
Charles A. Tufts,	Dover, N. H.,	1863–64
Enno Sander,	St. Louis,	1864–65
Elijah W. Sackrider,	Cleveland, O.,	1865–66
Ezekiel H. Sargeant,	Chicago,	1866–67
N. Hynson Jennings,	Baltimore,	1867–68
Edward S. Wayne,	Cincinnati,	1868–69
John H. Pope,	New Orleans,	1869–70
James G. Steele,	San Francisco,	1870–71
George F. H. Markoe,	Boston,	1871–72
Edward P. Nichols,	Newark, N. J.,	1872–73
John T. Buck,	Jackson, Miss.,	1873–74
William T. Wenzell,	San Francisco,	1874–75
T. Roberts Baker,	Richmond, Va.,	1875–76

Gustavus J. Luhn,	Charleston, S. C.,	1876–77
John Ingalls,	Macon, Ga.,	1877–78
Henry J. Rose,	Toronto, Can.,	1878–79
Joseph L. Lemberger,	Lebanon, Pa.,	1879–80
William S. Thompson,	Washington,	1880–81
George S. Leis,	Lawrence, Kan.,	1881–82
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Charles B. Guthrie,	Memphis, Tenn.,	1853–54
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Henry F. Fish,	Waterbury, Conn.,	1855–56
Henry T. Kiersted,	New York,	1856–57
A. E. Richards,	Plaquemine, La.,	1857–58
Robert Battey,	Rome, Ga.,	1858–59
Edwin O. Gale,	Chicago,	1859–60
Theodore Metcalf,	Boston,	1860–62
J. Faris Moore,	Baltimore,	1862–63
George W. Weyman,	Pittsburgh,	1863–64
Thomas Hollis,	Boston,	1864–65
Charles A. Heinitsh,	Lancaster, Pa.,	1865–66
John W. Shedden,	New York,	1866–67
Daniel Henchman,	Boston,	1867–68
Albert E. Ebert,	Chicago,	1868–69
Joel S. Orne,	Cambridgeport, Mass.,	1869–70
Eugene L. Massot,	St. Louis,	1870–71
Matthew F. Ash,	Jackson, Miss.,	1871–72
Henry C. Gaylord,	Cleveland, O.,	1872–73
Paul Balluff,	New York,	1873–74
Augustus R. Bayley,	Cambridgeport, Mass.,	1874–75
Christian F. G. Meyer,	St. Louis,	1875–76
Jacob D. Wells,	Cincinnati,	1876–77
Emlen Painter,	San Francisco,	1877–78
William H. Crawford,	St. Louis,	1878–79
Philip C. Candidus,	Mobile, Ala.,	1879–80
William Simpson,	Raleigh, N. C.,	1880–81
John F. Judge,	Cincinnati,	1881–82
William B. Blanding,	Providence, R. I.,	1882–83

TREASURER.

Alfred B. Taylor,	Philadelphia,	1852–54
Samuel M. Colcord,	Boston,	1854–56
James S. Aspinwall,	New York,	1856–57
Samuel M. Colcord,	Boston,	1857–59
Ashel Boyden,	Boston,	1859–60
Henry Haviland,	New York,	1860–63
J. Brown Baxley,	Baltimore,	1863–65
Charles A. Tufts,	Dover, N. H.,	1865–83

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George D. Coggeshall,	New York,	1852–53
Edward Parrish,	Philadelphia,	1853–54
Edward S. Wayne,	Cincinnati,	1854–55
William J. M. Gordon,	Cincinnati,	1855–59
Charles Bullock,	Philadelphia,	1859–60
James T. Shinn,	Philadelphia,	1860–62
Peter W. Bedford,	New York,	1862–63
William Evans, Jr.,	Philadelphia,	1863–64
Henry N. Rittenhouse,	Philadelphia,	1864–65
John M. Maisch,	Philadelphia,	1865–83

CORRESPONDING SECRETARIES.

William Procter, Jr.,	Philadelphia,	1852–53
William B. Chapman,	Cincinnati,	1853–54
William Procter, Jr.,	Philadelphia,	1854–57
Edward Parrish,	Philadelphia,	1857–58
Ambrose Smith,	Philadelphia,	1858–59
William Hegeman,	New York,	1859–60
Peter W. Bedford,	New York,	1860–62
John M. Maisch,	Philadelphia,	1862–63
Peter Wendover Bedford,	New York,	1863–66

LOCAL SECRETARIES.

Peter Wendover Bedford,	New York,	1866–67
Alfred B. Taylor,	Philadelphia,	1867–68
Henry W. Fuller,	Chicago,	1868–69
J. Faris Moore,	Baltimore,	1869–70
William H. Crawford,	St. Louis,	1870–71
Henry C. Gaylord,	Cleveland, O.,	1871–72
Thomas H. Hazard,	Richmond, Va.,	1872–73
Emil Scheffer,	Louisville, Ky.,	1873–74
Samuel A. D. Sheppard,	Boston,	1874–75
Adolphus W. Miller,	Philadelphia,	1875–76
Henry J. Rose,	Toronto, Can.,	1876–77
Jesse W. Rankin,	Atlanta, Ga.,	1877–78
Eli Lilly,	Indianapolis, Ind.,	1878–79
Charles F. Fish,	Saratoga Springs, N. Y.,	1879–80
William T. Ford,	Kansas City, Mo.,	1880–81
Hiram E. Griffith,	Niagara Falls, N. Y.,	1881–82
Charles Becker,	Washington,	1882–83

REPORTER ON PROGRESS OF PHARMACY.

C. L. Diehl,	Louisville, Ky.,	1873–83

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President, in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Alabama,	P. C. Candidus, cor. Dauphin and Cedar sts.,	Mobile.
Arkansas,	Geo. W. Cabell, Congress and Bull streets,	Hot Springs.
California,	James G. Steele, 521 Montgomery street,	San Francisco.
Colorado,	Hugo R. Hartung, 230 Fifteenth street,	Denver.
Dist. of Columbia,	John A. Milburn, 1101 F street, N. W.,	Washington.
Connecticut,	Charles A. Rapelye, 605 Main street,	Hartford.
	Alonzo F. Wood, 2 Church street,	New Haven.
	Luzerne I. Munson, Apothecaries' Hall,	Waterbury.
Delaware,	Linton Smith, cor. Seventh and Market sts.,	Wilmington.
Georgia,	Theo. Schumann, Whitehall and Hunter sts.,	Atlanta.
	Robert H. Land, 270 Broad street,	Augusta.
	John Ingalls, cor. Fourth and Poplar sts.,	Macon.
	Fleming G. Grieve,	Milledgeville.
Illinois,	Henry W. Fuller, 220 Randolph street,	Chicago.
	David G. Plummer, 6 Main street,	Bradford.
	Albert E. Ebert, sugar refinery,	Peoria.
Indiana,	Joseph F. Brandon, 18 East Anderson street,	Anderson.
	Henry J. Schlæpfer, Second and Main sts.,	Evansville.
	George W. Sloan, 7 East Washington street,	Indianapolis.
	David Hilt, 84 Main street,	Lafayette.
	Jefferson S. Conner, 121 Pearl street,	New Albany.
Iowa,	Theodore W. Ruete, 379 Main street,	Dubuque.
	Olaf M. Oleson, Market street,	Fort Dodge.
	George H. Schafer, 129 Front street,	Fort Madison.
Kansas,	George Leis, 90 Massachusetts street,	Lawrence.
Kentucky,	C. Lewis Diehl, cor. Third and Broadway,	Louisville.
	William H. Averill, 435 Main street,	Frankfort.
Louisiana,	Isaac L. Lyons, 42 Camp street,	New Orleans.
	Joseph G. Thibodeaux, Main street,	Thibodeaux.

Maine,	Noah S. Harlow, 4 Smith's Block,	Bangor.
	Edmund Dana, Jr., 373 Congress street,	Portland.
Maryland,	Robert Lautenbach, Eutaw and Saratoga sts.,	Baltimore.
	Thomas W. Shryer, 103 Baltimore street,	Cumberland.
Massachusetts,	S. A. D. Sheppard, 1129 Washington street,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, 51 Vine street,	Charlestown.
	Frederick T. Whiting, Main street,	Gr't Barrington.
	Freeman H. Butler, 141 Central street,	Lowell.
	Benjamin Proctor, 6 Healey's Arcade,	Lynn.
	Samuel O. Daniels, Main and Summer sts.,	Natick.
	James E. Blake, 64 North Second street,	New Bedford.
	Joseph J. Estes, cor. Union and Church sts.,	Rockland.
	Thomas B. Nichols, 159 Essex street,	Salem.
	Charles P. Alden, 270 Main street,	Springfield.
	William Bush, 56 Front street,	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	William Johnston, 163 Jefferson avenue,	Detroit.
Minnesota,	Karl Simmon,	St. Paul.
Missouri,	James F. Hurt, Broadway,	Columbia.
	William T. Ford, 1305 Cherry street,	Kansas City.
	William H. Crawford, 800 Washington av.,	St. Louis.
Nebraska,	Charles F. Goodman, 180 Farnham street,	Omaha.
New Hampshire,	Bayard T. Perry, 1088 Elm street,	Manchester.
	E. S. Russell, 69 Main street,	Nashua.
	Joseph H. Thatcher, 12 Market street,	Portsmouth.
New Jersey,	Albert P. Brown, cor. Fifth and Federal sts.,	Camden.
	John B. Drake, 132 Broad street,	Elizabeth.
	Hermann Klussmann, Fourth street and Lafayette avenue,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 831 Broad street,	Newark.
	Robert E. Parsons, 19 Main street,	Orange.
	William H. Voorhees, 21 West Front street,	Plainfield.
	G. A. Mangold, 4 East State street,	Trenton.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	G. C. Close, cor. Smith and Schermerhorn sts.,	Brooklyn.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L Du Bois, 281 Main street,	Catskill.
	James T. King, cor. Main and South streets,	Middletown.
	Daniel C. Robbins, 91 Fulton street,	New York.
	H. S. Sherwood, 339 Main street,	Poughkeepsie
	G. H. Haass, 38 Main street,	Rochester.
	John G. Bissell, 45 Dominick street,	Rome.
	Charles F. Fish, 114 Broadway,	Saratoga.
	George E. Duryee, 191 State street,	Schenectady.
	Charles W. Snow, 28 East Genesee street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.
	Robert J. Toplis, Getty square,	Yonkers.
North Carolina,	Addison S. Lee, 14 Fayetteville street,	Raleigh.
	James C. Munds, Third street,	Wilmington.

Ohio,	William K. Foltz, 1465 Howard street,	Akron.
	Walter H. Howson, Water street,	Chillicothe.
	J. U. Lloyd, N. W. cor. Court and Plum sts.,	Cincinnati.
	Henry C. Gaylord, 110 Monument square,	Cleveland.
	Charles Huston, 43 South High street,	Columbus.
	Thomas J. Casper, 41 East Main street,	Springfield.
	Charles Hohley, 248 South street,	Toledo.
	Edgar M. Hatton, Fifth and Main streets,	Zanesville.
Pennsylvania,	Edward T. Myers, 16 Main street,	Bethlehem.
	Jacob A. Miller, cor. Second and Chestnut sts.,	Harrisburg.
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 8 North Ninth street,	Lebanon.
	Francis W. Walker, Jr.,	New Brighton.
	Rich. M. Shoemaker, cor. Fourth and Race sts.,	Philadelphia.
	James B. Cherry, 23 Fourth avenue,	Pittsburgh.
	Philip M. Ziegler, 526 Penn street,	Reading.
	Edward A. Cornell, Tenth and Pine streets,	Williamsport.
Rhode Island,	James H. Taylor, 104 Thames street,	Newport.
	Albert L. Calder, 163 Westminster street,	Providence.
South Carolina,	Gustavus J. Luhn, Post-office box No. 582,	Charleston.
Tennessee,	Jas. S. Robinson, cor. Third and Madison sts.,	Memphis.
	John C. Wharton, 38 Union street,	Nashville.
Texas,	Thomas W. Powell, 10 Houston street,	Fort Worth.
Virginia,	Frederick H. Masi, cor. Main and Granby,	Norfolk.
	T. Roberts Baker, 919 East Main street,	Richmond.
West Virginia,	Edmund Bocking, 1 Odd Fellows' Hall,	Wheeling.
Wisconsin,	Edward B. Heimstreet,	Janesville.
	John R. Drake, 255 South Water street,	Milwaukee.
Prov. Nova Scotia,	Francis C. Simson,	Halifax.
Prov. Ontario,	George Hodgetts, 305 Yonge street,	Toronto.
Prov. Quebec,	Henry R. Gray, 144 S. Lawrence Main st.,	Montreal.

LIST OF QUERIES.

TO BE ANSWERED AT THE THIRTY-FIRST ANNUAL MEETING, 1883, TO BE HELD AT WASHINGTON, D. C.

QUERY 1.—Examine the sugar- and gelatin-coated Quinine pills of the market, and report on their quality as regards purity and proportion of Quinine.

Accepted by Virgil Coblentz, Springfield, O.

2. It has been said that if snow, formed in any month but April, be melted and bottled, the water will become ropy; that snow which falls during the month of April, upon the contrary, will furnish water which will remain limpid the summer through, and which can be used by pharmacists and photographers. Experiments on this subject are desired.

Accepted by George W. Sloan, of Indianapolis.

3. What is the quality of commercial Oil of Lemon?

For general acceptance.

4. It has been said that Sulphate of Cinchonidine, containing a considerable proportion of Magnesium Sulphate, has been found on the market. Is this true as regards the salt made by any of our American manufacturers?

Accepted by George W. Kennedy, of Pottsville, Pa.

5. What is the Citrate of Caffeine of commerce in this country? Good authorities have stated that the German preparation is simply a mixture of Citric Acid and Caffeine.

Accepted by C. Gilbert Wheeler, of Chicago.

6. It has been asserted that some of the pills of the market are coated with mixtures of starch, terra alba, chalk, etc., although supposed to be coated with pure sugar. Is this true?

Accepted by Professor P. W. Bedford, New York City.

7. Examine and report upon the Tannates of Quinine of commerce.

Continued to Charles P. Hartwig, Chicago, Ill.

8. Are commercial Volatile Oils adulterated to any extent? What is generally used as the adulterant?

Continued to W. H. Crawford, St. Louis.

9. What is the alkaloidal strength of the Fluid Extract of Cinchona of the market, and how does it compare with the requirements of the Pharmacopœia?

Accepted by H. B. Parsons, N. Y.

10. Ethereal Oil of male fern deposits a sediment. Is the sediment or the overlying oil the desirable portion?

Continued to Charles P. Hartwig, Chicago.

11. What proportion of the Cinchona barks of commerce will answer the pharmacopœial tests? Give particulars.

Accepted by H. B. Parsons, of New York.

12. Are the compound Cathartic Pills of commerce prepared in accordance with the Pharmacopœia?

Accepted by S. Henry Stevens, Pittsburgh.

13. Lead plaster and other plasters of the United States Pharmacopœia get hard and brittle by keeping. How can their soft consistence, as when freshly made, be preserved?

Continued to Hugo W. C. Martin.

14. What is the quality of the Belladonna leaves of the market?

Accepted by Byron F. McIntyre, of New York.

15. It has been asserted that some pharmacists pay percentages to physicians who send prescriptions to their stores. Is this true to any great extent? What is the feeling of the pharmacists of our country regarding the matter, and the feeling of physicians?

Continued to Hugo W. C. Martin.

16. Will Iodide of Potassium, of foreign and of home manufacture, answer the tests of the Pharmacopœia? Which averages best?

Accepted by Professor A. B. Prescott, of Ann Arbor.

17. The alkaloid Berberine is, by some writers, claimed to be nearly insoluble, while others claim it is freely soluble in water. This discrepancy in statements should be investigated.

Accepted by O. Eberbach, Ann Arbor.

18. What is the chemical nature of the acrid principle of Mezereon bark?

Accepted by O. Eberbach, Ann Arbor.

19. Is Brucine poisonous? Dr. Garrod has stated that it is not.

Referred to Roberts Bartholomew, M.D., Philadelphia, Pa.

20. The bark of Rhamnus Purshiana contains a substance that is said to strike a red color with ammonia. What is this principle?

For general acceptance.

21. The Pharmacopœia recognizes three species of Buchu. Is there any difference in their medicinal action? Which is to be preferred?

Accepted by Professor P. W. Bedford, New York.

22. Does Fluid Extract of Ergot deteriorate by age?

For general acceptance.

23. Is the yellow principle of Berberis Aquifolium root identical with Berberine?

Continued to Professor F. B. Power, Philadelphia.

24. What is the nature of the crystalline precipitate which forms in tincture of Boletus Laricis?

Accepted by C. W. Phillips, Cincinnati.

25. What menstruum is best adapted to extract and hold in solution the desirable principles of Licorice root.

Continued to F. F. Prentice, Janesville, Wis.

26. Is it not desirable to have a Stathmetometric as well as Volumetric method inserted into the Pharmacopœia, thus doing away with the absolute need of measuring apparatus, which are dependent upon temperature?

Accepted by William W. Bartlett, Boston.

27. What is the best method of maintaining the proper temperature of a liquid in the course of examination?

For general acceptance.

28. What is the best practical method for the pharmacist to pursue in order to determine melting-points?

For general acceptance.

29. Is it desirable that pharmacists be held personally responsible for the quality of the goods which they dispense?

Accepted by Robert H. Cowdrey, Chicago.

30. What is the most desirable form of Pepsin for dispensing purposes?

For general acceptance.

31. What is the crystalline form of the white alkaloid of Hydrastis Canadensis (Hydrastine)? What is its formula?

Continued to Frederick B. Power, Philadelphia.

32. Does the Brucine of commerce contain Strychnine? An examination of the Brucine of commerce is desired.

Accepted by S. A. D. Sheppard, Boston.

33. It is said that the essential oil of Mustard Seed of the market consists of two kinds, one made of the seed, the other made artificially. Information is desired, with sketch of mode of manufacture.

For general acceptance.

34. Describe the structure of the different varieties, or species, of Senega of commerce. It is particularly desirable that a thorough microscopic examination be made of the roots of authentic specimens of Polygala Senega and its varieties, and of Polygala Boykinii.

Continued to E. B. Stuart, Peoria, Ill.

35. Good authority states that artificial Salicylic Acid is now used in making Oil of Wintergreen, and that this artificial oil is cheaper than the natural. To what extent is this true?

For general acceptance.

36. What is the present production of Bromine in this country?

Accepted by W. J. M. Gordon, Cincinnati, O.

37. To what extent does the Iodine supply depend on the supply of Kelp?

Accepted by Professor P. W. Bedford, New York.

38. Is there any difference in the laxative properties of Rhamnus Purshiana bark and the bark of Rhamnus Frangula?

Continued to Professor E. S. Wayne, Cincinnati.

39. What is the quality of the narcotic herbs of commerce?

Continued to C. S. Hallberg, Chicago.

40. What is the percentage of Hydroxide of Potassium in commercial white caustic potash?

Continued to Adolph G. Vogeler, Chicago.

41. Is Oil of Birch bark sold in commerce under the name Oil of Wintergreen?

Accepted by George W. Kennedy, Pottsville, Pa.

42. What is commercial musk?

For general acceptance.

43. Is the Sulphate of Quinine imported into this country and sold in bulk equal to that of our manufacturers?

For general acceptance.

44. It has been asserted that in percolating powdered drugs, the alcoholic menstruum increases in alcoholic strength, owing to absorption of water by the drug. Experiments are desired.

Accepted by J. U. Lloyd, Cincinnati.

45. Does Oil of Thyme, made years ago, contain a larger proportion of thymol than that of the present day?

Accepted by Professor Joseph P. Remington, Philadelphia.

46. What is the difference between white and red Oil of Thyme?

For general acceptance.

47. A good process for determining Tannic Acid.

For general acceptance.

48. What is the proportion of Caffeine in the powdered Guarana of commerce?

Accepted by J. H. Feemster, Cincinnati.

49. The source and supply of indigenous drugs.

Accepted by C. B. Allaire, Peoria, Ill.

50. What is commercial Oil of Cade?

For general acceptance.

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PREFATORY NOTICE.

The Proceedings for the year 1882 are issued with a portrait of the late George Wansay Andrews, of Baltimore, who was the first First Vice-President of the American Pharmaceutical Association, elected to that office at the organization of the Association, in 1852, and who, in 1856, when the Association met for the first time in his native city, was called to the presidential chair. Mr. Andrews took a deep interest in the advancement of pharmacy and of science in general. He had been associated in membership with the Maryland Academy of Sciences for nearly half a century, and with the Maryland College of Pharmacy from the first inception, serving as its President for a number of years. He died in 1877, at the age of seventy-six years. A brief biographical sketch of Mr. Andrews will be found on page 861 of the Proceedings for 1878.

Most of the wood-cuts used in this volume were loaned by the publishers of "New Remedies," "American Journal of Pharmacy," "Pharmacist," "Druggists' Circular," and "Oil and Drug News," and one was furnished by Professor Lloyd.

The prices of the several issues of the Proceedings now on hand, *including postage*, are:

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All orders for Proceedings should be addressed to the Permanent Secretary, John M. Maisch, 143 North Tenth Street, Philadelphia, Pa.

The Thirty-first Annual Meeting will be held in Washington, D. C., on the second Tuesday (11th day) of September next. Blank applications may be obtained from the authorized agents, or from the Permanent Secretary. Applications for membership should reach the Chairman of the Committee on Membership, George W. Kennedy, on or before September 1st; if sent later, they should be addressed to the Local Secretary, Charles Becker, 1367 Thirty-second Street, West Washington, D. C. The fees should be sent in postal money-orders, in drafts, or in bank check.

LIST OF MEMBERS AND DELEGATES IN ATTENDANCE AT THE THIRTIETH ANNUAL MEETING.

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PROCEEDINGS

OF THE

THIRTIETH ANNUAL MEETING

OF THE

American Pharmaceutical Association.

REPORT ON THE PROGRESS OF PHARMACY.

FROM JULY 1, 1881, TO JUNE 30, 1882.

BY C. LEWIS DIEHL.

THE report which is herewith presented will be found to contain about the usual useful information, but is probably a more complete exponent of pharmaceutic progress than some of the previous reports, inasmuch as most of the journals furnished have been very thoroughly extracted. For the first time in a number of years also, it has been possible to keep pace with the material presented, so that the report is now completed, and will be ready for the printer as soon as the cuts needed,—which are in the hands of the engraver,—can be prepared.

The arrangement is that which has been customary, and it seems doubtful whether this can be materially improved upon, particularly since in the present report a system of cross-references has been inaugurated, which, while incomplete in this, may doubtless be improved upon in future reports. This has been done for several reasons, but principally because their cross-references are calculated to draw attention to subjects which, in the course of abstraction, are lost under obscure headings. Thus it may happen that some new principle, preparation, or substance is described under the substance from which it is obtained, or with which it is associated. If this new principle, etc., is then noticed under its proper heading, and reference is made to the substance or substances under which it is described, attention will be directed to it in a way in which it can scarcely escape notice. Moreover, this system of cross-references will materially aid the indexing, which has hitherto not been as complete as it should be. The Report on the Progress of Pharmacy may now and then be read systematically, but it is chiefly useful as a work of reference, and as such it is of importance that it should be provided with a good index. No one can appreciate this more than the reporter, who has in each report occasion to refer to subjects noticed in previous reports, and has often been compelled to bring his memory into requisition when the index failed to give the proper reference. It is confidently believed that under the system inaugurated much that has hitherto escaped will find its way into the index, and this alone would seem to warrant much more additional space than the insignificant amount which is consumed. It should be mentioned that the idea of introducing cross-references did not occur until the report was well advanced, and that, therefore, many substances have not been noticed in this way in the present report.

Finally, the reporter has endeavored to make the abstract as brief and concise as is in accord with the utility of the work.

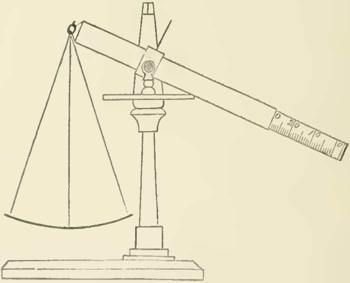
PHARMACY.

A. Apparatus and Manipulations.

WEIGHTS—MEASURES—SPECIFIC GRAVITY.

New Dispensing Balance.—Dr. John Gorham suggests a form of balance for prescription purposes, in which a rod or tube sliding within a tubular arm replaces an external movable weight. The new balance is shown by Fig. 1, which sufficiently explains its form and mode of operation.—New Rem., July, 1881, p. 198; from Brit. Med. Jour.

Fig. 1.

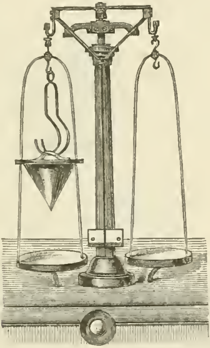


Gorham's Dispensing Balance.

Spiral Balance—Value for Different Purposes.—Mr. C. F. Cross, having occasion for frequent and rapid weighings of a substance in an atmosphere saturated with aqueous vapor, found Jolly's "Federwaage" or spiral balance to answer the purpose better than any other form of balance. This instrument, which was originally described by Mr. Jolly in "Sitzungsber. Bay. Akad.," 1864, I. 162, is now again described by Mr. Cross, and the different uses to which it may be put in the laboratory are mentioned, so that other chemists may profit by its use as he has done. The only improvement which he suggests is the enlargement of the scale pan, which, also, he has constructed of mica instead of glass.—Chem. News, August 26th, 1881, pp. 101–103.

New Apparatus for Weighing Filters.—In weighing filters containing precipitates, it is the usual practice to inclose them either within watch-glasses held together by a clamp, or within thin, wide-mouthed bottles provided with glass stoppers. Both of these methods, however, particularly the former, have some disadvantages, owing to the smallness of the space into which the filter must be pressed, to the necessity of taking hold of it with the hand so as to fold in the edges, and to the alteration of form, which often prevents their replacement in the funnel for a fresh treatment with solvents. Mr. C. Gilbert, of Hamburg, avoids these defects by inclosing the filter in a small, hollow cone (of 60°), (see Fig. 2), made of nickel-plated sheet copper, and

FIG. 2.

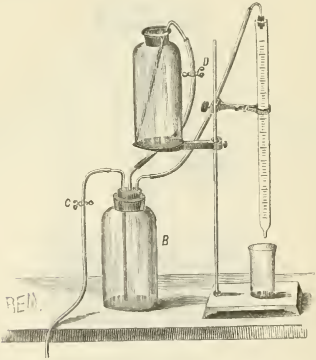


Gilbert's Apparatus for Weighing Filters.

provided with a turned-over, planed edge, upon which a thin piece of plate-glass is placed and held fast by a clamp. The filters are placed, during the drying, upon small hollow porcelain cylinders, from which they are transferred to the copper cone with the pincers. The cone is suspended in the balance like the potash-bulbs. To avoid the necessity of touching the cone with the hands, it is usually kept and carried about in a small tinned-iron cylinder.—New Rem., November, 1881, p. 326; from Repert. d. Analyt. Chem., 1881, p. 264.

Burettes—Attachment for Filling, etc.—Mr. Fr. O. Roeder having had trouble in procuring burettes with glass stopcocks which would not leak when freed from grease, made an apparatus having the following arrangement (see Fig. 3): A Mohr burette is connected by means of glass and rubber tubing with a bottle (*B*) having three openings, to enable it to be filled and emptied (with water). Free communication between the burette and *B* is always to be maintained.

Fig. 3.



Attachment for Filling Burettes.

The siphon used to empty *B* is closed by means of a compression clip (*C*), as is likewise the siphon used to fill *B* from the reservoir placed above it. To fill the burette have *B* filled with water, close the clip *D*, place the lower end of the burette into the liquid used as a reagent, open the clip *C* and as the water flows from *B*, the burette will be filled. To empty the burette, close the clip *C* and open *D*, and as much liquid as runs into *B* will be discharged from the burette. Use corks boiled in paraffin in preference to india-rubber stoppers, and see that all the joints are tight. The latter may be accomplished by the use of melted paraffin upon all joints excepting those between the glass and rubber tubing, with which there is never any difficulty.—New Rem., February, 1882, p. 35.

Specific Gravity—Determination by the aid of Burettes.—Brügelmann draws attention to the simple method of determining the specific gravity of liquids, already recommended by Phipson, and applies it to the determination of the specific gravity of solids. Phipson's method consists in measuring a certain volume of the liquid by the aid of an accurate burette, and weighing it in a tared beaker. The specific gravity of solids is taken by adding a weighed quantity to the measured quantity of liquid in the burette and reading off the increase in volume, etc.—Pharm. Ztg., No. 41, 1882, p. 303.

Specific Gravity—Differential Method of Determination.—Mr. W. Dittmar suggests a method for determining the difference between two liquids of the same kind, and of very nearly the same density, by weighing a known volume of one liquid within the other, whereby the derived difference can be obtained directly and with greater exactitude than by ascertaining the specific gravities themselves. The apparatus required are as follows:

1. A cylindrical specific-gravity bottle, provided with a narrowly perforated glass stopper, and a hook (above or below) for suspending it from the balance by a fine platinum wire.

2. A cylinder large enough to float the bottle, supposing it to be suspended in a mass of liquid within the cylinder.

3. A balance, so arranged that things can be suspended below the pans, and when thus suspended are at convenient working height.

After having ascertained (once for all) the capacity of the bottle for water, charge it with liquid I, suspend it from the balance within a mass of the same liquid, and ascertain its apparent weight (p' grams). Then repeat the experiment with liquid II inside, and note down the result p''.

If the capacity of the bottle is $= v$ fluid grams, we obviously have $v\,(s'' - s') = p'' - p'$, or—

$$s'' - s' = \frac{p'' - p'}{v}.$$

In both weighings care must be taken to give the inner liquid time to assume the temperature of the outer. The author illustrates the method by several examples, and draws attention to the usefulness of its application:

1. For the preparation of large supplies of standard solutions, supposing a small quantity of the correct solution to be at hand.

2. For the determination of the specific gravity of waters in general, and sea-water in particular, as of dilute solutions generally.

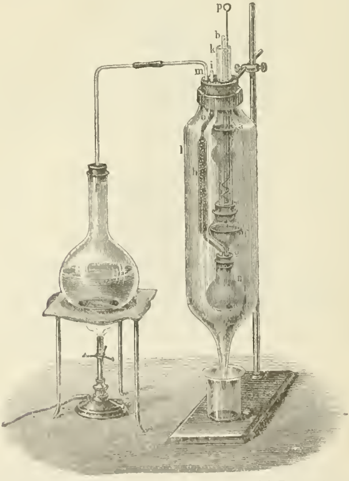
3. For the execution of *Hammer's* process for the determination of tannin in infusions of oak bark, etc. (see Fresenius's "Quantitative Analysis," p. 673, of edition vi.).

4. For the examination of butter fat by Mr. Bell's method.—Chem. News, July 29th, 1881, p. 51.

SOLUTION, PERCOLATION, ETC.

Apparatus for Determining Solubilities at High Temperatures.—Victor Meyer has devised the apparatus illustrated by Fig. 4, by means

FIG. 4.



Meyer's Apparatus for Determining Solubilities at High Temperatures.

of which the exact solubility of substances at high temperatures may be determined, the whole operation being performed within an atmosphere raised to the proper temperature. A suitable quantity of the solvent, together with an excess of the substance, having been previously heated to the desired temperature, the mixture of solution and undissolved substance is transferred to the bulb-tube *a*, which is previously connected with the other parts of the apparatus, as shown in the cut. The lower end of the tube is closed by a rubber stopper (not shown in the cut), which is perforated by a hole closed by the end of a glass rod *b*. The end of the tube passes through a rubber stopper in the neck of a pear-shaped funnel *f*, within which is placed a dry filter. The funnel is connected with the small flask *n*. *p* is a thick silver or platinum wire, spirally twisted below, by means of which the solvent and substance may be agitated. From the small flask *n* projects a chloride of calcium tube *h*, filled with fragments of this salt, which tube may be omitted in all cases where a somewhat considerable amount of solution is collected in the flask, as the amount of water lost by evaporation is comparatively small. Before the experiment, the flask *n* is weighed together with the chloride of calcium tube. The connections are then made, as shown in the cut, and the whole of the apparatus connected with the large rubber stopper *m* is now inserted into the receptacle *k*. Water, or some other liquid furnishing the proper temperature when boiling, is heated in the flask, and the vapor of the liquid allowed to pass through the apparatus for about fifteen minutes, any condensed liquid being caught by the beaker placed below. The solvent and substance having repeatedly been agitated with the wire *p*, a suitable quantity of the solution is finally allowed, by slightly disengaging the glass rod *b*, to flow into the filter *f*, and thence into the flask *n*. When sufficient solution has passed into the latter the current of steam is interrupted, the apparatus taken apart, and the flask *n* with the chloride of calcium tube, after being thoroughly dried outside, weighed. The contents of the flask are then rinsed into a capsule, and the solid contents determined by evaporation to dryness.—New Rem., March, 1882, p. 67.

Percolation—Objections to the Process for the French Pharmacopœia.—From a report in the "Répertoire de Pharm.," it appears that the next revision of the Codex will give the preference to maceration over percolation in preparing tinctures. The reasons given are as follows:

1. Maceration gives excellent results every time a substance is to be exhausted with the smallest possible quantity of menstruum.

2. It affords products identical, and often superior, to those obtained by percolation.

3. It requires no delicate manipulation, often difficult for unskilful or inexperienced hands.

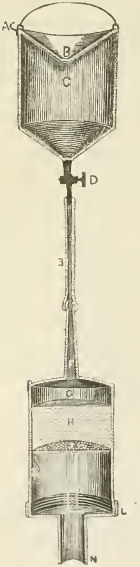
4. It necessitates no pulverization, and, therefore, dispenses with

the previous desiccation by which some active and volatile principles are often dissipated.

At the same time, percolation will not be absolutely discarded. The future Codex will give a process for the use of the pharmacist, when, for some reasons, he may think percolation preferable —Drug. Circ., January, 1882, p. 1.

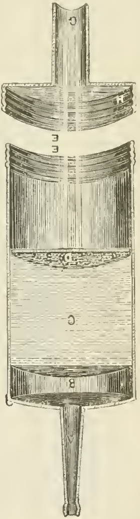
A New Percolator.—Mr. Nathan Rosenwasser describes a new percolator, which is illustrated by Figs. 5 and 6. It is simply the ordinary percolator reversed, attaching a long tube (rubber usually answers) to the nozzle, and connecting it to the menstruum reservoir *C*

FIG. 5.



Rosenwasser's Percolator.

FIG. 6.



Rosenwasser's Percolator Inverted.

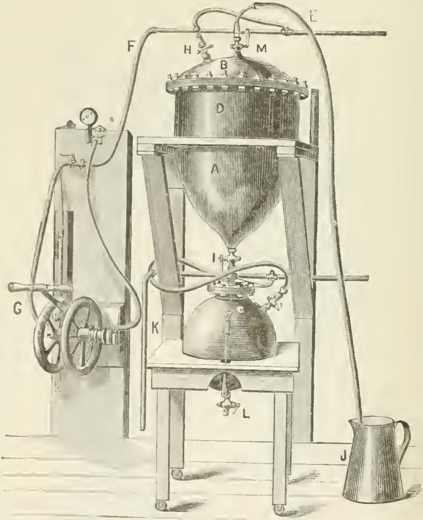
(Fig. 5), for which a funnel or similar apparatus will answer. Fig. 5 represents the percolator in position, ready for the liquid to flow, while Fig. 6 represents the percolator inverted, with the open end, *E*, apart, and ready for packing the drug. The porous diaphragm (*B*, Fig. 6, *G*, Fig. 5) is first placed in position; the drug is, after previous moistening, packed tightly into the percolator, occupying the dotted space *C*, Fig. 6, and *H*, Fig. 5. A porous diaphragm (*D*, Fig. 6, *J*, Fig. 5) is placed on the drug and fastened to the body of the percolator by any simple contrivance. The bottom-plate (*H*, Fig. 6, *L*, Fig. 5) is easily secured to the body of the cylinder, and the bottom or outlet-tube is easily closed with cork or rubber tube and pinchcock. The percolator, having been packed very tightly on the bottom, and less so proceeding upward, and the diaphragm holding the drug in place, having a piece of muslin or filtering medium placed between it and the drug, is now reversed; the menstruum reservoir (*C*, Fig. 5), is attached by means of the tube (*E*, Fig. 5), and suspended by the handle of the menstruum reservoir. The percolator is ready, the menstruum is poured into the reservoir, the opening to which is closed with a notched cork, and percolation begins.

The advantages of this form of percolator and the process involved in its use are, in the author's experience, manifold. The drug is held in place so that it cannot expand in any direction; this insures the greatest possible compactness, while, by increasing the height of the column of menstruum, lateral pressure is completely overcome and percolation proceeds at the will of the operator, and not, as heretofore, at the will of the drug. A minimum quantity of liquid only is consumed in the process, and it is quite possible to exhaust drugs completely by 1 pint of menstruum for 16 troy ounces, while the portion of menstruum retained by the drug, which is reduced to a minimum, is almost completely expelled by water. Such drugs as rhubarb, squill, colomba, dandelion, etc., have been converted into fluid extract by percolation with proof spirit (using 17 fluid ounces per 16 troy ounces of drug) followed by water, with excellent results.—Am. Jour. Phar., November, 1881, pp. 567–572.

New Displacement Apparatus.—Mr. Robert F. Fairthorne describes a new displacement apparatus, which is illustrated by the accompanying cut (Fig. 7). The shape of the percolator differs somewhat from the usual form, being to some extent egg-shaped, whereby free percolation is insured. The cover (B), which is hemispherical in shape, is fastened upon the body (A) by means of clamps, with india-rubber rings between to render the joint air-tight. The drug to be operated on, having been sufficiently moistened with the menstruum and packed, is next exhausted of as much air as possible by a vacuum being produced through the upper part of the vessel by means of an air-pump

(G), which is connected with it by means of the tube (F). The stopcock (H) is next closed and (M) opened, connecting with the tube (E), the end of which dips into the liquid to be employed as menstruum, and thereby a sufficient quantity of it is allowed to be drawn into the displacer to cover the drug. The stopcock (M) is then closed and the materials allowed to macerate for several days. To start the percolation the receiver (C) is exhausted of air and the tap (I) having been opened the saturated fluid will begin to drop, and continue to do so so long as the force of the vacuum in the receiver is equal or greater than that in the upper vessel. When it begins to stop, air is admitted above the drug, which is drawn through the material, carrying with it much of the remaining liquid. To finish the operation air is forced into the percolator by means of the pump.

Fig. 7.

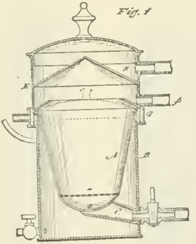


Percolator with Air-Pump.

In using the apparatus for preparing "fluid extracts" only one pint of menstruum for every sixteen troy ounces of material is employed, and after the liquid has ceased to run into the receiver more menstruum is added, just sufficient to produce a pint of the finished product. No separation of any portion of the tincture is required.—Amer. Jour. Phar., May, 1882, p. 236–239. A similar apparatus, based upon the same principles, was figured and described by F. Stearns in the "Medical Advance," 1871.

Combined Percolator and Still.—Mr. Byron Fennor has invented the combined percolator and still, shown by Fig. 8, which appears to offer many conveniences, while it is not at all complicated. The percolator *A*, in which is placed the material from which the strength is to be obtained, is cone-shaped, and formed at the upper edge with a flange, by which it is suspended in the heating-tank *B*. The bottom of the percolator has an opening which communicates with the lateral tube *C*. This tube registers with a hole in the tank, and a flanged stopcock is screwed into the end of it, which serves to keep the percolator in place, and to make a tight joint over the hole in the tank. A perforated diaphragm is placed in the bottom of the percolator, which prevents the materials used from obstructing the flow of the menstruum from the bottom. The still attachment *E* is of larger diameter than the tank, and, when in place, the bottom of it rests in the annular chamber which surrounds the top of the tank, and should be filled with water when the still is used, to seal the joint between the two parts of the apparatus. A short distance above the lower edge of the still attachment a cone-shaped flange is attached, which forms an annular gutter around the inside of the still, and con-

FIG. 8.

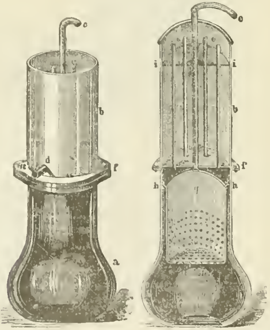


Fennor's Percolator and Still.

ducts the distillate which flows from the condenser to the pipe *f*. The condenser is formed by securing a conical partition below the upper edge of the still and forming the receptacle *H*, in which there is water or ice, and by which the vapors that arise from the percolator are condensed, and flow into the gutter and out of the pipe *f*. When the device is used for any purpose where heat should be maintained, water is admitted to the tank *B* through the pipe *f*, and heat applied to the tank, being communicated to the percolator only through the medium of the water. When the still is removed, a cover, shown by dotted lines, may be used.—New Rem., June, 1882, p. 180.

Continuous Extraction Apparatus—Improved Construction.—The apparatus (Fig. 9) is recommended for continuous extraction, either for analysis, or, on a large scale, for manufacturing. It is an improved form of Thorn's Extractor, described in "New Rem.," 1881, p. 263. Within the boiler, *a*, the extraction vessel or percolator, *g*, is suspended on a projecting ledge at *h h*. Sufficient space is left at the sides to permit the vapors of the volatile liquid to ascend. The upper half of the apparatus consists of a condenser, traversed by a number of tubes, the central one of which, *c*, is curved at the top, and may be connected with an ordinary condenser, in order to recover the volatile liquid, after the extraction is completed. The other tubes project a short distance above the upper plate of the condenser, but are closed on top.

FIG. 9.



Thorn's Extraction Apparatus.

Their lower orifice projects slightly below the bottom of the condenser, and is obliquely cut off, to facilitate the dropping of the condensed liquid. When the apparatus is to be used, a piece of linen, or filtering-paper, is tied over the perforated part of the extractor, the substance to be extracted is placed in the vessel, and a sufficient quantity of the volatile liquid in the outer boiler.—New Rem., May, 1882, p. 147.

Dialysis—Relative Action of Bladder and of Parchment Paper.—Experiments made by Wöllmer seem to show that true dialysis can only take place if animal membrane (*e.g.*, bladder) is employed, whilst where parchment is used a kind of filtration occurs which permits the passage of colloids, to a certain extent, along with crystalloids. This is the case to a greater degree with the more porous varieties of parchment paper, but the best kinds have a similar effect. The author, furthermore, finds that among the substances that will permeate animal membrane there are some that resemble all others rather than crystals, and that, therefore, the definitions "colloid" and "crystalloid" cannot be very exact.—Pharm. Ztg., No. 47, 1882, p. 348.

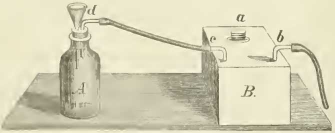
Osmosis—Use of Parchment Paper.—About four years ago Dubrunfaut introduced a method of osmosing sugar molasses on a large scale, and recommended the use of Belgian parchment paper for diaphragm. A. Eckstein, having had a large experience in the manufacture of parchment paper, found that the ordinarily prepared paper was insufficient for dialyzing purposes. This was the case with endless paper. As the thickness of the ordinary paper is irregular, parchment paper prepared from it shows thick, thin, firm, and loose places, hence the passage of liquid through it will be irregular. By doubling or trebling parchment paper these difficulties are overcome. The sheets of paper are laid above one another and intimately united.—Jour. Chem. Soc., October, 1881, p. 952, from Dingl. Polyt., I.

FILTRATION.

Rapid Filtering Apparatus.—The simple and inexpensive filtering apparatus shown by Fig. 10 has been contrived by "H. S.," by whom it is found very useful for rapid filtering, washing, etc. It consists of "A," a common wide-mouthed half-gallon jar, and "B." a can holding three, four, or five gallons; a castor-oil can answers the purpose splendidly, and any tinner will fix it to suit for a few cents. The cap and screw, "*a*," is for readily filling "B;" "*b*," the exhaust-pipe, reaches inside of the can, nearly to the bottom; the tin tube, "*c*," is soldered on the head of B, connecting with the interior. The jar A, having a funnel fitting into it through an air-tight stopple, is connected with B by means of the bent glass tube, "*d*," and rubber tube.

B is now filled with water, and the solution to be filtered is placed in the funnel. "*b*" is now connected with a rubber tube, six, eight, or ten feet long, and four or five millimeters in diameter (the longer the tube the more rapid the filtration). The siphon thus formed is started and the apparatus is in full running order.—New Rem., September, 1881, p. 266.

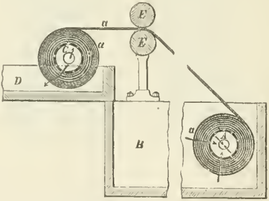
Fig. 10.



Apparatus for Rapid Filtration.

Continuous Filter.—Paul Casamajor and Charles H. Senff, of New York, have patented an ingenious arrangement for filtering liquids, shown by Fig. 11. *A* and *C* are two cylinders, the surfaces of which are perforated with numerous holes, and the axles of which are hollow. One of the cylinders, *A*, is situated in the liquid which is to be filtered; the other in or over a tank of water. By means of a suction-pump the muddy liquid in the tank, *B*, is forced through the different layers of filtering-cloth into the hollow axle of the cylinder, and from there passes, as a clear filtrate, to wherever it is needed. The cylinder being slowly revolving, a clean surface of filtering-cloth is constantly presented to the liquid. The clogged filtering-tissue passes through a pair of rollers, *E E*, which deprive it of most of the liquid, and is gradually wound upon the cylinder, *C*, where water is forced through the interior, and thereby cleanses the tissue.—New Rem., May, 1882, p. 151.

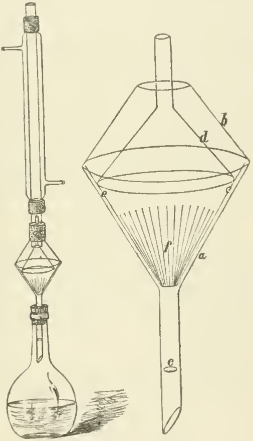
Fig. 11.



Continuous Filter.

Filtering Apparatus for Quantitative Work.—Dr. L. Cohn has devised a filtering apparatus (see Fig. 12) which is intended to abbreviate the time required for washing precipitates on filters, by employing plaited filters in the manner described, and where Bunsen's quick filtering method cannot be employed. Two funnels, *a b*, of about 65 mm. (2⅝ inches) diameter, one of which (*a*) has a very broad exit tube, are ground upon each other, accurately, with their edges, and the exit tube of *b* is cut off so that the upper orifice has a diameter of 25 mm. (one inch). This is closed with a perforated cork, carrying the end of the inner tube of an upright condenser. About 25 mm. (1 inch) from the end of the outlet of funnel, *a*, a small hole, *c*, is filed. Within the funnel are placed, at an angle of 90°, two small glass-rods of about 3 mm. diameter, of such length that the funnel, *d*, which is afterwards inverted over the filter, rests upon the upper ends of the two tubes. The funnel, *a*, is next inserted, through a perforated cork, in the neck of a flask held in a retort stand, and the flask fixed firmly against the rim of the funnel, *b*, which is connected with the condenser. A well-plaited filter, of such size that it does not come in contact with the

FIG. 12.



Cohn's Filtering Apparatus.

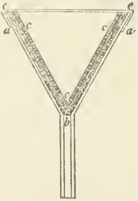
edges of the funnel, *d*, having previously been introduced, and the precipitate having gradually been transferred to the filter (in which case it is best to use a portion of the liquid originally mixed with the precipitate as a mechanical agent to facilitate the transfer), as soon as the apparatus has been combined in the manner before described, a gentle heat is applied to the flask, which causes some of the water to be volatilized. This is condensed again in a condenser, and trickles constantly upon the precipitate, which thereby becomes rapidly washed. Notwithstanding its frail character, which leads the editor of the "Chemiker Zeitung" to doubt its practicability, the editor of "New Remedies" believes its use can be still further and more profitably extended to the continuous exhaustion of substances.—New Rem., March, 1882, pp. 71–72, from Chem. Ztg.

Filter-Paper—Presence of Acid.—E. Heintz draws attention to the observation made by him, that filter-paper almost invariably contains a little free acid, which is readily shown by the reddish edge developed on the spot produced by a drop of tincture of litmus. Writing-paper contains so much of the acid (hydrochloric) that it may be extracted by water.—Pharm. Ztg., August 13, 1881, p. 487.

Filtering Paper Pulp—Rapid Preparation.—R. De Puy directs to prepare this pulp by placing the paper in a mortar, pouring on enough soda or potassa solution to thoroughly wet it, stirring it with a pestle for a minute or two, to reduce it to pulp, and then transferring it to a strainer and washing the pulp until all traces of alkali are washed out. The process is very rapid.—New. Rem., April, 1882, p. 100, from Canad. Pharm. Jour., xv. 3.

Asbestos Filter.—K. Trobach has patented a filtering apparatus (see Fig. 13), which consists of an ordinary funnel, into the neck of which is

FIG. 13.



Asbestos Filter.

placed a perforated cone, *b*, and into which a perforated lining, *c c*, is introduced, after the inner walls of the funnel have been covered with asbestos. The lining is held in place by a clamp, *e*. The contrivance is useful, but, in our opinion, not new, and we fail to see where the patent comes in.—New Rem., May, 1882, p. 150.

Clarification of Liquids by the Intervention of Magnesia.—Andreas Tschirikow has found that liquids which contain minute foreign particles in suspension may be rapidly clarified by mixing them with a solution of sulphate of magnesium and afterwards milk of lime. Naturally, the process is only applicable to such liquids in which the presence of an excess of lime will not be of any harm, or where it will not even remain in solution. For instance, liquors may be thus thoroughly clarified. At the same time waste water may be deprived of most of its organic impurities by mixing it with the two reagents, and hence the process may also be used, to a certain extent, for disinfecting. It is, however, not thoroughly reliable for this purpose, but is nevertheless useful in many cases, particularly where the precipitate produced (consisting chiefly of magnesia and sulphate of calcium) might furnish nourishment to the soil.—New Rem., September, 1882, p. 266, from Pharm. Zeitschr., für Russl., No. 22.

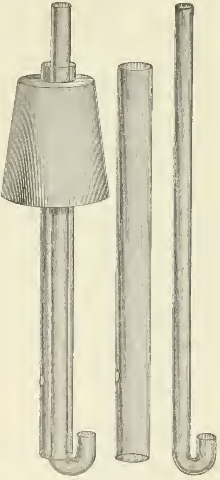
PRECIPITATION.

Washing Precipitates.—Mr. R. De Puy advises the following method for washing precipitates, which has answered well: After forming the precipitate, the whole mixture is poured into what is known as a two-bushel bag; this, after folding over the top, is put into an ordinary drug press, and a very gradual pressure is applied until the greater portion of the liquid is pressed out, observing not to press so hard as to cause the precipitate to cake. The operation is repeated with fresh portions of water, stirred into the precipitate, as often as may be necessary. The washing of precipitates can then be completed in as many minutes as it takes hours in the ordinary way of decantation, etc.—Can. Pharm. Jour., August, 1881, p. 3.

Washing Precipitates.—W. Sartorius accomplishes the rapid washing of precipitates as follows: The precipitate being effected, a large funnel is tied over with muslin, and this with filter-paper; a long rubber tube is attached to the neck of the funnel, which is then introduced into the precipitating vessel so that the long rubber depends from its mouth at a considerable height. The funnel and tube are then filled by suction, and are thus caused to act as a siphon. This action is continued as long as may be necessary, fresh water being poured on the precipitate from time to time. The washing of golden sulphuret of antimony, which, in the ordinary way, required three days, was thus accomplished in a single day.—Pharm. Ztg., No. 94, 1881, p. 704.

Automatic Precipitate Washer.—The accompanying cut (Fig. 14) illustrates a tube for washing precipitates, which has been contrived by Mr. Samuel J. Hinsdale. It is somewhat on the principle of the Berzelius tube, but is less fragile, and can be constructed without much skill in glass-blowing. It can be used with hot or cold water, as well as with alcohol and alkaline solutions. The cut represents the exact size of the apparatus complete, and also of the tube of which it is constructed, *except that the curved end of the small tube has been drawn in the cut about one-eighth of an inch too long.* To construct it, place the small tube into the large one as shown in the illustration, and fasten it at the curved end by means of a short section of rubber tubing fitting around the small tube and accurately closing the larger

FIG. 14.



Automatic Precipitate Washer.

one (this does not appear in the cut). Place a perforated cork over the large tube at the other end, and it will be ready for use. The cork is inserted into a pint or quart flask two-thirds filled with water (or other liquid), and adjust it over a filter so that the end of the curved tube will be just under the surface of the liquid in the filter.—Drug. Circ., November, 1881, p. 162.

Apparatus for Washing Precipitates.—Mr. Andrejeff describes the apparatus (shown by Figs. 15 and 16) which somewhat resembles that of Gay-Lussac, but answers the purpose more satisfactorily. A flask or plain bottle is fitted with a sound cork bearing two glass tubes of different calibre. One of these, $a\,b\,c\,d$, is slightly narrower than the other, and serves for the admission of air. The other, $e\,f\,g$, is a little wider, and conveys the water to the filter. The first-mentioned tube is bent upwards at its lower end, the bend at C being on a level with the surface of the precipitate to be washed in the filter, and the short leg d rising to the level to which it is desired to fill the filter with water. On blowing air in the flask or bottle, through a, water begins to pass over through the tube $e\,f\,g$, and continues to flow until the water in the filter is on a level with d. As soon as this point is reached, the flow stops, at the same time the water in the longer leg of the tube $b\,c$ also stands on a level with d. This column of water gradually descends, in proportion as the liquid passes through the filter; and as soon as the water has reached the bend at c, air enters the flask again, and a new supply of water passes over in the filter. By varying the length of the knee $c\,d$, the intermission between the successive

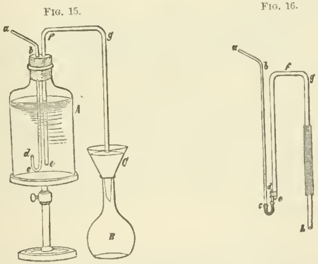


FIG. 15. FIG. 16.

Andrejeff's Apparatus for Washing Precipitates.

washings may be made longer or shorter. This may be readily accomplished by using a piece of flexible rubber-tubing, with a small additional glass tube inserted in it, as shown in Fig. 16. The height of the point at *d* is then easily adjustable, by tying the little glass-tube to the inner leg of *e f* higher or lower.—New Rem., May, 1882, p. 153; from Chem. Centralbl., XII., p. 815, and Pharm. Centralh., No. 5 (1882).

Wash-bottle—New Form.—A. E. Johnson has devised a new form of wash-bottle, which he has found very effective. The improvement consists in a modification in the form of the blowing-tube, by means of which a continuous jet of water can be obtained for some time after ceasing to blow, and steam and badly-smelling vapors are prevented from entering the mouth.

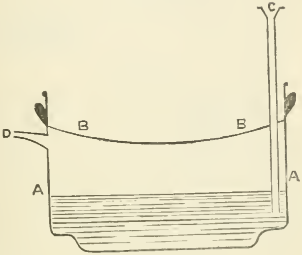
The blowing-tube is made as follows: Bend a piece of glass-tubing, to form the same angle as that of the blowing-tube of an ordinary wash-bottle; then bend one end completely round in a plane at right angles to the plane of the angle previously made, and break off the straight portion of the tube a little way from the bend. Now bend another piece of tubing completely round, and break off one of the arms very near the bend. This last-made tube is then put through its hole in the cork of the bottle, and joined by a short piece of india-rubber tubing to the shorter limb of the other tube. The two tubes thus joined are tied together at the top by a piece of string. The cork of the bottle should project some little way in order that the india-rubber tube may be closed at will by pressing it with the thumb against the side of the cork.

When washing with boiling-water, etc., close the india-rubber tube with the thumb before commencing to blow, and before ceasing, close it again, in order to prevent steam from getting into the mouth, and also to get a continuous jet.—New Rem., March, 1882, p. 85; from Chem. News, October 28th, 1881.

APPLICATION OF HEAT, ETC.

Steam Generator—Cheap Construction.—Professor Garrison, at a meeting of the Chicago College of Pharmacy, suggested that a serviceable generator of steam for evaporating and distilling may be constructed from a vessel similar to a washboiler, as shown in the cut (Fig. 17). Into this vessel (*AA*) a diaphragm (*BB*) is soldered. A tube (*C*) is passed through this, reaching nearly to the bottom of the vessel. A nose (*D*), to which a rubber conducting-pipe may be attached, is then inserted beneath the diaphragm. Water being poured through the tube *C* to partly fill the boiler, heat is applied, and steam is readily generated, its pressure being dependent on the height of

FIG. 17.

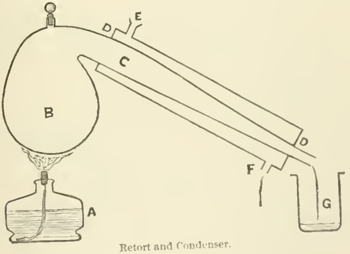


Steam Generator.

the tube *C*. The diaphragm serves for the purpose of evaporating liquids, etc.—The Pharmacist, January, 1882, p. 5.

Glass Retort, with Condenser.—Professor H. Gray Bartlett, at a meeting of the Chicago College of Pharmacy, exhibited a new contrivance for combining a glass retort and condenser in one (see Fig. 18). The long neck (*C*) of the retort (*B*) is fitted into the canister (*DD*), forming the discharge-pipe into the receiver (*G*). The ends of the canister are made water-tight by strips of rubber tissue, three inches

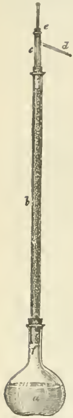
FIG. 18.



Retort and Condenser.

wide, wound tightly over the ends *DD*, and then wound with twine. Cold water is introduced at *E* and discharged at *F*. It is, in fact, the principle of the Liebig condenser applied directly to the neck of the retort, and is found by Professor Bartlett to answer so well that, by using ice-water for circulation and surrounding the receiver (*G*) by ice, it is possible to condense nitrous ether.—The Pharmacist, January, 1882, p. 4.

FIG. 19.



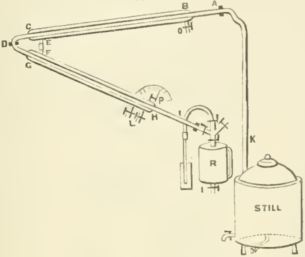
Hempel's Apparatus for Fractional Distillation.

Apparatus for Fractional Distillation.—By following the principles laid down by Ilgen for the construction of stills, Mr. Walther Hempel has devised a simple rectifying apparatus of great efficiency, which is illustrated by Fig. 19. *a* is an ordinary flask; *b* a wide glass tube, which is completely filled with glass-pearls of about 4 mm. diameter; *c* is a three-way tube, which is connected with the condenser by the leg *d*, and bears a thermometer in *e*. To prevent the glass-pearls from falling out of the tube, the lower end of the latter (at *f*) is somewhat contracted in the flame. This author succeeded, with this arrangement, in obtaining alcohol of 95 per cent., at *one* distillation, from alcohol of 18 per cent. The liquid in the flask *a* should boil only gently, since otherwise the vapors would not be sufficiently cooled off on passing over the glass-pearls.—New Rem., January, 1882, p. 14; from Zeitschr. f. Anal. Chem., 1881, p. 502.

Pharmaceutical Apparatus.—Mr. A. C. Abraham makes some timely remarks on the difficulty of obtaining properly-constructed pharmaceutical apparatus in the regular market, and draws attention to the useful construction of some. Among others, a

Modified Liebig's Condenser, which is shown in the accompanying cut (Fig. 20), and is described as follows: *A* to *B*, 6 inches; *B* to *C*, 10 feet; *D*, steam-tight joint; *E* to *F*, ¾ inch tube, nearly meeting, not joined; *G* to *H*, 8 feet; *H* to *I*, 2 feet; *L*, stopcocks for supply of other condensers; *O*, hot water exit; *P*, stopcock, with index to regulate the flow of water. In a properly-constructed Liebig's condenser, a rapid current of water should drive that in front of it further and further *without materially mixing with it*, until, at last, it is driven out at a very high temperature, having done all, or nearly all, the work it possibly could. In designing his new condenser he went on this principle, and not only had the outer or cooling-tube constructed as small as possible, but, to further increase its condensing powers, had a thick copper wire wound spirally round the inner tube, so as to compel the water to rotate at a high speed. This construction is shown by Fig. 21, the diameter of the internal tube being 1 inch, and of the external one 1½ inch; both No. 16 wire gauge copper tubing. The efficiency of this condenser is such that it would, if only

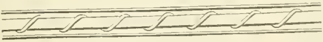
Fig. 20.



Modified Liebig's Condenser.

half its present length, condense and cool perfectly about 6 gallons

Fig. 21.

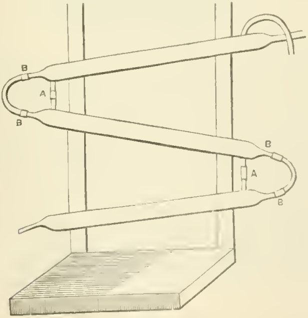


Section, showing Internal Coil.

of liquid (water? Rep.) per hour. It occupies next to no space, as it may be fixed to the wall. On a smaller scale, a

Triple Liebig's Condenser may be constructed as shown by Fig. 22.

Fig. 22.

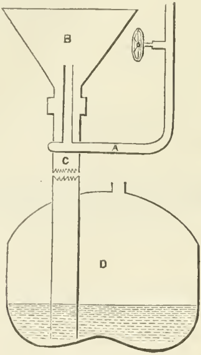


Triple Condenser.

The author used for this purpose glass and rubber tubing, together with the copper from an old rose-water or orange-flower-water copper for the outer tubes. *A*, *A* are india rubber junctions, to carry water from one limb to another; *B*, *B* are india rubber junctions, between the ends of condenser and curved tubes. Another very useful apparatus is the

Steam Funnel (shown by Fig. 23), particularly for heating glass flasks and in cases where it is desirable to remove the heat at a moment's notice. For evaporation from an open basin it is much more rapid than an ordinary steam-bath, because the jet of steam, impinging directly against the bottom of the vessel, imparts its heat to it much more rapidly. *A* is a steampipe, giving a jet upwards into the funnel *B*; *C*, a straight tube to carry off condensed water into the reservoir *D* (constructed of an old oil of bergamot copper), which also serves to prevent steam passing downwards. The water collecting in this reservoir may be drained off by a siphon.—Phar. Jour. Trans., May 13th, 1882.

FIG. 23.

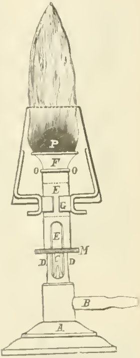


Steam Funnel.

Rubber-packing.—To make rubber-packing air and steam-tight it is brushed over with a solution of powdered rosin in ten times its weight of stronger water of ammonia. At first, this solution is a viscid, sticky mass, which, however, after three or four weeks, becomes thinner and fit for use. The liquid adheres easily to rubber, as well as to wood and metal. It hardens as soon as the ammonia evaporates, and becomes perfectly impervious to liquids.—New Rem., January, 1882, p. 22.

Gas-burner for producing High Temperatures.—Dr. Robert Muencke has constructed a new gas-burner, which is said to produce a very high temperature, suitable for fusions, etc., in laboratories. This is accomplished by attaching to the upper opening of a Bunsen burner a short tube gradually expanding and surmounted by a convex hood of wire-cloth, whereby the flame is subdivided into a compound of a great number of small blue flames (instead of consisting of a large central core of unconsumed gas and an exterior flame). The production of a good flame, devoid of luminousness, is, however, also dependent upon a proper supply of air.

Fig. 24.



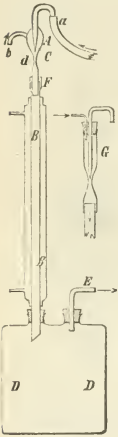
Muencke's High Temperature Gas-burner.

In the accompanying illustration (Fig. 24), *A* represents the base of the burner, *B* the gas-nipple, *D* a tube screwed into the socket and provided with three longitudinal slits. *M* is a disk fastened to the tube as a handle. Over the tube *D* fits another, *E*, which is twice as long and has openings corresponding to those in the tube *D*. *G* is a movable ring bearing curved wires for holding the draft-chimney, and *F* is the burner-attachment with the convex head *P*. Before lighting the gas, the three lateral slits in the tube *D* are covered; by gradually turning the tube *E*, the admission of air is regulated, until the inner cone of the flame becomes smaller and finally disappears entirely, after which the flame will consist of a number of hemiglobular, bright-blue, independent flames of great heat-power.—New Rem., January, 1882, p. 14; from Dingl. Polyt. Journ., vol. 241, p. 380.

Spirit Lamps—Application of Petroleum Burners.—Dr. Münder has found ordinary petroleum burners to serve an excellent purpose when applied to spirit-lamps. They may be regulated, do not produce a sooty flame, and do not cause the heating of the spirit in the reservoir if the inner opening of a round burner is provided with a piece of folded brass gauze. The application was originally suggested by F. Mohr (1873).—Arch. d. Pharm., January, 1882, p. 54.

Simple Steam Blast.—Mr. W. Thoerner ("Repert. f. Anal. Chem.," 1881, p. 246) describes a simple steam-jet blast for chemical laboratories, which is illustrated by Fig. 25. Steam generated—if not otherwise available—in a small copper boiler, and of a pressure of about five pounds, is conducted through a strong rubber tube to the jet *A*, which may be made of glass, in the usual manner, having an inner tube ending in a fine orifice of about one millimeter in diameter, situated directly over the contracted neck at *d*, which has an inner diameter of 2 to 2.5 millimeters. Beyond *d* the tube expands again and is connected at *F* with a condenser. The steam issuing from the point *C* carries with it a considerable quantity of air, admitted through *b*, and on its passage through the condenser is reconverted into water, which collects in the two-necked Woulffe's bottle below, together with the air, which is under pressure. If the apparatus is to be used as a blast, the tube *b* is left open, and the exit at *E* connected with the blowpipe. If it is to be used as a vacuum-pump, the exit at *E* is left open, and the tube *b* connected with the vessel to be exhausted. Instead of the form of jet, shown at *A*, which is entirely constructed of glass, the form at *G* may be used, which may be put together from portions of apparatus available in every laboratory.—New Rem., January, 1882, p. 14.

Fig. 25.



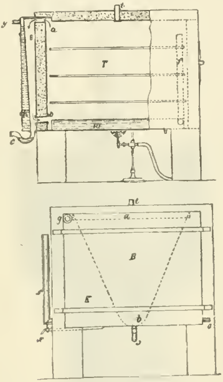
Thoerner's Steam-jet Blast.

New Drying Oven.—W. Kirchmann has devised a new drying closet for the use of chemists, pharmacists, etc., which is shown by the accompanying cut (Fig. 26). The drying-closet proper, *T*, is provided with double walls, which are filled at the sides and top with non-conducting material. The bottom compartment, *w*, is filled through the tube *f* (*x* being the outlet) with water to be heated by a flame, or else it may be supplied by live steam.

A conical space *B*, within a cooling apparatus *K*, communicates with the drying-closet by way of a lateral connection at *a*, and the bottom tube *b*. The cooling apparatus is fed with cold water through *e*.

When the drying-closet has been charged with the objects to be dried, the first effect of the heat, applied below, will be to volatilize some of the moisture contained in the substance. This will be carried by the current of air through the opening *a*, in the direction of the arrows, and by coming in contact with the walls of the conical cooler *B*, the suspended moisture will be precipitated, while the dried air will re-enter the closet at *b* and abstract further quantities of moisture as long as any is present. The condensed water flows down the inner walls of the conical chamber and flows off at *c*.—New Rem., February, 1882, p. 44; from Dingler's Pol. Journ., pp. 241, 120.

Fig. 26.

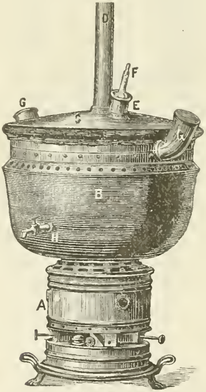


Kirchmann's Drying Oven.

New Drying Oven.—Ernst Kirchner has devised an apparatus which he claims to maintain a steady temperature of 100° C., without requiring watching, and which may be heated over a kerosene or gas stove.

The apparatus (Fig. 27) consists of a three-walled copper kettle *B*, with two lateral tubes *G*, *G*, communicating with the compartment inclosed between the inner and middle shell, and intended for filling this with water, and a small faucet *H*, likewise communicating with the inner compartment, by means of which the height of the water may be controlled. The compartment between the outer and middle shell is intended for the circulation of air, which enters at numerous orifices shown in the cut (at the shoulder), and is conveyed in a highly heated condition through numerous small tubes leading from the second to the third shell in the interior of the boiler. The heated current there ascends, and passes a sieve-like shelf, upon which are placed the articles to be dried. The kettle is covered by a copper lid tightly fitting by means of a felt washer. It is provided with a long chimney

FIG. 27.



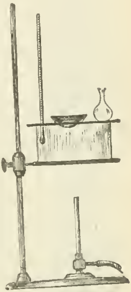
Kirchner's Drying Oven.

D, and a small tube for the insertion of a thermometer. It requires about twenty to thirty minutes, from the time the gas is lighted under the apparatus, if charged with cold water, to heat the air inside to 100° C., after which time it may be uniformly maintained.—New Rem., November, 1881, p. 327; from Neueste Erfind. und Erf., 1881, p. 249.

A Simple Drying Oven.—Mr. Adolph G. Vogeler observes, that the baking oven, sold with the coal-oil stoves now so much in use, will be found well adapted for the purposes of a drying oven. It answers an excellent purpose for making all kinds of scale preparations, including glycyrrhizin, as well as for drying extracts. The evaporation of small quantities of liquids is also nicely effected in this oven.—The Pharmacist, July, 1881, p. 245.

Air-bath—Simple Construction.—Dr. H. Fleck recommends the simple air-bath, illustrated by Fig. 28, which has been in successful use for several years, doing all the duty of a water-, oil-, or paraffin-bath. By a circular cut, or by other means, glass rings are prepared from glass cylinders of various sizes, about 1 to 2 liters capacity, and 2 to 10 cm. in height. These rings, which are open at both ends, are set upon an iron plate, and covered with a similar plate, which latter has suitable openings for receiving a thermometer and the vessels intended to be set upon it. If high temperatures are required, low cylinders (of about 2 cm. in height) are selected; low temperatures require higher cylinders (5 to 10 cm.) The cylinders are scratched with a diamond, in a vertical direction, so that, if they should crack, the fracture would always be up and down. This simple apparatus permits the maintenance of constant temperatures of 50 to 300° C. (122° to 572° F.) and over. Its transparency is an additional advantage, when it is of importance to watch the progress of reactions, as it often happens, in synthetical experiments.—New Rem., February, 1882, p. 44; from Repert. der Anal. Chemie.

Fig. 28.



Fleck's Air-bath.

Drying Chests—Convenient Construction.—Mr. R. Kirtsen constructs very efficient drying-chests, by lining strong wood-boxes, provided with well-fitting lids, with sheet tin or zinc, and placing suitable shelves in the same, while the bottom of these chests he covers thickly with quicklime. The lime retains its drying power even after having fallen to powder. The chests may be used for drying various articles, or for storing drugs known to be very hygroscopic. Dried extracts and powdered squills may be preserved unchanged. Saffron, cardamom, opium, vanilla, castor, and similar drugs can be readily dried and reduced to powder. Strongly odorous substances should be inclosed in extra tin boxes.—The Pharmacist, July, 1881, 255; from Pharm. Ztg.

GENERAL LABORATORY OPERATIONS.

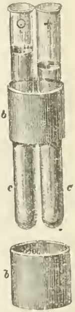
Improved Process for Scale Preparations.—A writer in "Monthly Magazine of Pharmacy" speaks of the difficulty experienced in the scaling of certain preparations, and draws attention to some recent suggestions for overcoming this difficulty. One of these consists in substituting polished metallic plates, preferably nickel-plated, for the glass plates usually employed, which are then, or as soon as desiccation has commenced, insulated and highly charged with electricity from a suitable "statical" machine; this exercises so powerful a *repulsive* action that the laminæ separate themselves from the plate and from each other almost before they are completely dry. Another plan is of more simple application, its *modus operandi* being the interposition of an inconceivably thin film of wax between the stratum of composition and the plate upon which it is laid, which effectually prevents too close adherence. The film is produced by dividing 50 grains of pure white wax in 10 ounces of ether, passing this rapidly over the previously cleaned plate and allowing to dry spontaneously. Redistilled benzoline, gasoline, or "sponge spirit," which are cheaper, may be substituted for ether, or the previously heated plates may be rubbed over with wax or spermaceti, and then rubbed with flannel until all has apparently been removed.—Drug. Circ., February, 1882, p. 18.

Moulds for Camphor-Ice, etc.—Cheap Construction.—Mr. Robert F. Fairthorne gives the following directions: Cut off two or three pieces of glass tubing, each 12 inches long and ¾ of an inch in diameter, and, having closed one end of each piece with a cork, moulds are formed that are everything that can be desired. When used they are placed in ice-water, and the melted camphor-ice or butter of cacao is poured into them and allowed to become solid, when, with slight pressure, they can be pushed out of the tubes and cut up into suitable-sized pieces.—Am. Jour. Phar., August, 1881, p. 395.

Microprismatic Method of Distinguishing Solid Substances.—Mr. O. Maschke describes a microprismatic method of distinguishing solid substances, which is dependent on a condition which he briefly explains as follows: "It is well known that objects viewed under the microscope increase in transparency, and the colors produced by aberration diminish in intensity in proportion as the index of refraction of the liquid in which they are immersed increases, but the fact that a deep coloration can make its appearance as soon as a certain condition is fulfilled appears to have been overlooked. This condition consists simply in an unevenness in the object produced by either plane or curved surfaces. Small fragments of the substance or a coarse powder are best suited for examination, since each particle presents numerous surfaces in varied positions. The coloration appears as soon as the liquid approaches that of the object, changes with every change in the former, passes rapidly and imperceptibly through a succession of tints, and only attains a certain degree of stability when the refractive power of the liquid is greater than that of the substance." For mineralogical objects the author uses water, amylic alcohol, glycerin, almond oil, and oil of cassia. Of course all substances that appear opaque under the microscope or that are themselves too deeply colored are excluded, as well as those which possess indices of refraction greater than that of oil of cassia, which, with the exception of bisulphide of carbon, possesses the highest refractive power of any liquid. For the details of this very interesting paper the reader is referred to "Phar. Jour. Trans.," December 24th, 1881, pp. 522–524; from "Ann. d. Physik u. Chemie," XI., p. 722.

Colorimeter—Simple Construction.—Dr. H. Hager proposes the following simple colorimeter. A cylinder, *b* (Fig. 29), is made of black or dark-colored paper, into which two test-tubes that are equal in width and glass can be inserted, as shown at *b*, *c*, *c*. The tubes are partly filled with the liquid to be tested, so that the line part can be compared against the light. It is necessary that the tubes lie closely together. The tube containing the normal liquid has the mark O on its surface, and that with the liquid to be tested the sign +. The application of the instrument is apparent. —Oil and Drug News, April 4th, 1882, p. 6.

Fig. 29.



Colorimeter.

Apparatus for Separating Ether from Watery Layers, etc.—See Ether, under "Organic Chemistry."

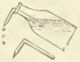
Apparatus for Observing the Color of Water.—See *Pure Water*, under "Inorganic Chemistry."

Apparatus for Estimating Carbonic Acid.—See *Carbonic Acid*, under "Inorganic Chemistry."

Apparatus for the Determination of Ammonia by Distillation.—See *Ammonia*, under "Inorganic Chemistry."

A Simple Dropper.—A very simple dropper (Fig. 30) may be made by bending a piece of glass rod at a right angle, and drawing one end out to a point. On inserting the other end into the bottle, and gently inclining the latter, some of the liquid will ascend along the tube, even before the liquid in the bottle has reached the mouth, and may be dropped at will.—New Rem., May, 1882, p. 154.

Fig. 30.



Dropper.

Asbestos Stoppers for combustion-tubes are made by J. Fleming White as follows: The asbestos is separated into fine threads, moistened with water, twisted into a plug, crowded into the cylinder of an ordinary steel crusher, such as is used to pulverize minerals for analysis, and compressed by driving the piston of the crusher down upon it with a hammer, or better, by the screw of a vice. The plug is kept under pressure for several hours, then dried within the cylinder upon a sand-bath, pushed out of the cylinder, and after ignition over a blast-lamp is ready for use. In this condition the plug loses no weight under prolonged ignition, is elastic enough to make a tight joint when fitted to a combustion-tube of suitable size, and may be smoothly perforated with an ordinary cork-borer.—Chem. News, August 5th, 1881, p. 65; from Am. Chem. Jour.

Papier-Mache Evaporating-Vessels, etc.—A writer in "Pharm. Centralh.," speaks highly of evaporating-vessels and funnels made of paper-mass and well varnished. The vessels can be exposed to heat in a water-bath, filled with different liquids, such as water, saline solutions, including a 10 per cent. solution of carbonate of sodium, olive oil, mineral oil, dilute acids, etc., without being thereby affected. Even ether and strong alcohol do not affect the varnish at first, but do so after some time. Caustic alkaline solutions, however, destroy the surface. Exposure to a dry temperature of 160° C. does not change them. They possess the inconvenient property of retaining the odor of essential oils, etc., that have been in contact, but, being, in addition to the above-mentioned merits, quite strong and durable, will doubtless find manifold applications in the laboratory.—Pharm. Ztg., No. 84, 1881, p. 630.

Zinc Vessels for Storing Vegetable Substances have been found by Dr. I. Nessler slightly corroded on the inner surface. He draws attention to this so that they may be frequently examined, and recommends that in such cases, the inner surface be coated with a good varnish. The corrosion appears to occur only in certain cases; in the case of most substances it was not noticed.—Arch. d. Pharm., January, 1882, p. 49.

Platinum Vessels—Corrosive Action of the Flame.—See ***Platinum***, under "Inorganic Chemistry."

Platinizing Metallic Vessels.—According to Hager, tin, brass, tinned iron and copper vessels may be coated with platinum, by painting their surfaces with a solution of 1 part of chloride of platinum in 15 parts of alcohol and 50 parts of ether, and after drying in a warm place, rubbing them with a linen or woollen cloth until polished. It is necessary that the vessels, before platinizing, shall be perfectly clean and bright. The coating of platinum so produced protects the vessels from the action of acids and alkalies. The coating is readily replaced in defective spots.—Arch. d. Pharm., April, 1882, p. 299, from Phar. Centralh., 1882, No. 8.

Tin-coating in the Cold Way.—J. Zilken communicates the following method of coating with tin in the cold way: The article is thoroughly cleansed, so as to remove fat, etc., first with potash, then with a 15 to 20 per cent. sulphuric acid. rubbed with sand, and finally washed with pure water. It is then immersed in a bath composed of 100 liters water, 200 to 300 grams stannous chloride, 300 grams alum, 450 grams common salt, and 200 grams of cream of tartar. The article, surrounded with strips of zinc, is allowed to remain in the bath for 8 to 10 hours, rinsed, placed into water containing 8 to 10 grams carbonate of magnesium in the liter, dried, and polished with fine sand.—Arch. d. Pharm. Jan., 1882, p. 55, from Dingl. Journ., vol. 249, No. 3.

Labels on Tin.—A very good method of causing labels to adhere to tin is a dilute solution of white gelatin, or, better still, of isinglass. Its strength should not be more than one in twenty, and it may be applied by means of a pencil or sponge. It has this advantage, that labels applied to the surface so covered do not adhere permanently at once, but may be slid about long enough to permit their proper adjustment and straightening.

Other methods are the following: 1. Soften good glue in water, then boil it with strong vinegar, and thicken the liquid, during boiling, with fine wheat flour, so that a paste results. 2. Starch-paste with which a little Venice turpentine has been incorporated while it was warm. 3. Paint solution of tannin over the spot, let dry, and then affix the label, previously gummed and moistened.—From Phar. Zeitg., in New Rem., October, 1881, p. 293 and 303.

Cement for Mending Pestles.—Mr. Robert F. Fairthorne states that one of the strongest cements, and one that can be readily made, is obtained when equal quantities of gutta-percha and shellac are melted together and well stirred. This is best done in an iron capsule placed on a sand-bath, and heated either over a gas-furnace or on the top of a stove. It is a combination possessing both hardness and toughness, qualities that make it particularly desirable in mending pestles and mortars. When this cement is used the articles to be mended should be warmed to about the melting-point of the mixture, and then retained in proper position until cool, when they are ready for use.—Am. Jour. Phar., August, 1881, p. 396.

B. Preparations.

AQUÆ.

Aromatic Waters—Solubility of Carbonic Acid in Them.—See *Aquæ*, under "Pharmacy."

Elatina—An Italian Substitute for Tar-water.—In this preparation, which is largely used in Italy in place of tar-water, Ciutlini gives the following formula: Green pine cones, 6 kilos; olibanum, 80 gm.; tolu balsam, 50 gm; Burgundy pitch, 40 gm.; juniper berries, 600 gm. The mixture is macerated over night in sufficient water. Afterwards 12 kilos of distillate are obtained by the aid of a slow fire. The liquid is filtered, bottled, and used in doses of half a tumblerful two or three times a day.—Am. Jour. Phar., August, 1881, p. 404; from Phar. Ztg., 1881, p. 285.

Hunyadi Yanos Mineral Water—Preparation Artificially.—An artificial mineral water, which will be found to possess every advantage attributed to the natural water, is made by Professor Charteris by dissolving magnesium sulphate, 514.92 grains; sodium sulphate, 519.54 grains; potassium sulphate, 2.76 grains; sodium chloride, 39.15 grains; and sodium bicarbonate, 15.60 grains; in water, 16 ounces. Dose, 2 ounces and upwards. A product made by following Liebig's analysis was found to be too weak, and did not produce purgative action.—Am. Jour. Phar., June, 1882. p. 310; through Phar. Jour. and Trans., February 25th, p. 703; from Lancet.

CERATA ET UNGUENTA.

Petroleum Ointments—Products Suitable for their Preparation of Different Melting-points.—Mr. S. A. D. Sheppard has visited the oil regions, where facilities were extended to him to make a thorough inquiry into, and examination of, the products that may be suitable for the preparation of petroleum ointments having different melting-points, a very interesting description of which is given. The author arrives at conclusions which he sums up as follows:

Although the term paraffin may be and is properly applied chemically to any one of the long series of hydrocarbons, commencing with marsh gas and running up through the benzins, the illuminating oils, and the lubricating oils, to paraffin wax, the usage of trade really confines the term paraffin to those of the series that are solid or semi-solid at ordinary temperatures. It is in the latter sense that the term will be used in the following remarks.

Petroleum, as it comes from the earth, may be said to be capable of division into three parts by distillation, viz., into what may practically be termed two series of oils: the benzin oils, and the paraffin oils, and paraffin wax.

The division between the two series of oils may be said to occur in the process of distillation when very carefully conducted, when the gravity of the distillate has been reduced to about 42° to 41° Baumé

The benzin oils are colorless or white oils, and have a peculiar benzin odor. They are also said to have a definite boiling-point.

The paraffin oils are yellow or straw-colored oils, and have a greasy or waxy odor.

The oils in the paraffin series are very easily split up into other and lighter products of the same series by the skilful application of heat.

The article desired as a base for ointments by physicians and pharmacists is really amorphous paraffin mixed with a certain amount of one or more of the above-mentioned series of paraffin oils, but entirely free from admixture with any of the benzin series or the *crystalline* paraffin wax.

The benzin oils, if present, give an objectionable odor, and the crystalline paraffin wax, if present, will, in time, especially if the article be exposed to a low temperature, render it granular and cause it to separate, thus losing that homogeneous character so desirable in an ointment.

The question now is how to obtain this desired article. From all crude petroleum oils paraffin settles to a greater or less degree, so that if a tank containing two hundred and fifty barrels has been used as a well for three or four years, it may be expected to contain at the bottom of the tank a deposit, ranging in depth from four to eight inches, of a mixture containing a large proportion of paraffin. This paraffin is always in an amorphous condition, the crystalline character being found only in those products that have been subjected to the process of distillation.

Observations show that this amorphous paraffin and the harder varieties that clog the pipes may be easily obtained in quantities sufficient for all the demands of medicine and pharmacy. We have, therefore, ready formed for us in Nature's laboratory, the article we desire, but it is contaminated by oils of the benzin series, with odorous and coloring matter; the oils are gotten rid of by careful distillation, and the other by filtration through animal charcoal.

The harder variety, "rod wax," is the article that may be used to advantage to increase the melting-point of petroleum ointment. Its melting-point being about 140° F., and it being an amorphous and not a crystalline paraffin, it can be mixed, when purified, with goods of a lower melting-point, to make a homogeneous article, as is shown by samples of such mixture that have stood more than a year. It is better, however, that the admixture be made previous to distillation. It is necessary that the animal charcoal, used as a filtering medium, be freed *by recent burning* from condensed noxious gases or other impurities.

To obtain petroleum ointment of a desired melting-point, it is necessary to *start* right; that is, to select such crude material as will, by distillation, or purification in some way, give a residuum having the wished-for melting-point. It is the opinion of the writer that, to obtain an article having a melting-point anywhere from 100° to 120° F., such crude material can be obtained easily, abundantly, and at a fair price, and that if a demand should be created for such an article, the demand will be quickly supplied.

The above conclusions are given as the opinions of the author, derived from careful thought and experiment in the past, and now confirmed by observations and experiments under circumstances where it would seem that just conclusions might be formed.—New Rem., May, 1881, pp. 130–133.

Steatina—A New Substitute for Ointments and Plasters.—These are preparations of about the consistence of wax, and intended for external use in the place of ointments and plasters, which are, the one too soft and the other too hard for obtaining the full effects of the medicinal ingredients. The old name *cerata* has been discarded, since many of the compounds do not contain wax.

Steatinum Belladonnæ.

R. Sebi ovilli,	p. 5.
Adipis suilli,	
Emplastri plumbi solidi,* āā,	p. 2.
Extracti belladonnæ,	p. 1.

Melt the first three articles together, and, when congealing, add the extract, previously triturated with a mixture of equal parts of water, alcohol, and glycerin until of a syrupy consistence. Mix thoroughly.

In the same manner prepare steatinum conii, steat. digitalis, and steat. hyoscyami.

Steatinum Chlorali Camphoratum.

R. Chlorali hydratis,	
Camphoræ, āā,	p. 2.

Mix in a vial at a moderate heat until liquefied, then add

Ceræ flavæ,	p. 5.
Sebi ovilli,	p. 11,

previously melted together at a very moderate heat.

Steatinum Chlorali.

R. Chlorali hydratis subtillime pulveratæ,	p. 2.
Olei olivæ,	p. 5.

Dissolve, and mix thoroughly with

Sebi ovilli,	p. 6.
Ceræ flavæ,	p. 7,

previously liquefied.

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* Lead plaster deprived of water and glycerin.

Steatinum Opiatum.

R. Sebi ovilli,	p. 20.
Olei ricini,	p. 5.
Styracis liquidi,	p. 3.
Elemi, āā,	
Bals. Peruviani,	p. 2.

Melt together, keep in a water-bath, and decant. To the purified mass, p. 25, add

Empl. plumbi solidi,	p. 15.
Extracti opii,	p. 1,

the latter previously dissolved in a mixture of water, 2 p.; alcohol, 1 p.; and glycerin, 1 p.

Steatinum Piceatum.

R. Picis liquidæ,	p. 12.
Sebi ovilli liquefacti,	p. 100.

Digest in a closed vessel for a day, and decant.

In like manner prepare steat. cum oleo cadino and steat. c. oleo rusci.

Steatinum Piceatum Fortius.

R. Picis liquidæ,	p. 1.
Ceræ flavæ,	p. 1.
Sebi ovilli,	p. 4.

Prepare like the preceding.

Steatinum Chloroformi.

R. Chloroformi,	p. 1.
Olei olivæ, āā,	

Mix and add to the following, previously melted together at a low temperature:

Sebi ovilli,	p. 1.
Ceræ flavæ,	p. 2.

Steatinum Iodatum.

R. Iodi subtillime triti,	p. 1.
Spir. vini absoluti,	p. 3.

Dissolve with the aid of heat, add

Olei ricini,	p. 7,

and mix with the following, previously liquefied:

Sebi ovilli,	p. 7.
Ceræ flavæ, āā,	

Steatinum Iodoformi.

R. Sebi ovilli,	p. 18.
Ol. myristicæ expressi,	p. 2.
Iodoformi subt. pulv.,	p. 1.

Dissolve with the aid of a water-bath.

Steatinum Mercuriale.

R. Hydrargyri,	p. 25.
Ungt. hydrargyri (old),	p. 5.

Triturate until globules of mercury are no longer visible; then mix with the nearly cold mixture of

Adipis suilli,	p. 22.
Sebi ovilli,	p. 10.
Empl. plumbi solidi,	p. 18.

Steatinum Sublimati.

R. Hydrarg. chloridi corros.,	p. 1.
Alcoholis,	p. 10.

Dissolve; add

Olei ricini,	p. 50,

and mix with the nearly cold mixture of

Sebi ovilli,	p. 900.
Ceræ albæ,	p. 50.

Steatinum Thymolatum.

R. Thymoli,	p. 1.
Olei olivæ,	p. 5.

Dissolve, and mix with

Sebi ovilli,	p. 190.
Ceræ flavæ,	p. 4.

Steatinum Veratrini.

R. Veratrini,	p. 1.
Spiritus,	p. 10.

Dissolve, add

Olei ricini,	p. 15.
Olei menthæ piperitæ, Olei lavandulæ,	q. s.,

and mix well with

Sebi ovilli,	p. 75.
Ceræ albæ,	p. 10.

Steatinum Zinci Benzoatum more Bellii.

R. Zinci oxidi,	p. 1.
Adipis benzoinati,	p. 2.
Sebi ovilli benzoinati,	p. 4.

M. sec. art.

Larger amounts of aqueous saline solutions cannot be permanently incorporated with cerates, and are apt to undergo decomposition with plasters. If incorporation of the dry salts be inadmissible, a mass of suitable consistence may be prepared from gelatin, glycerin, and water, and applied by saturating with it muslin or gauze. Substances rendering gelatin insoluble cannot be applied in this manner.—Am. Jour. Phar., August, 1881, p. 404, 405; from Ber. Klin. Wochenschr., 1881, No. 21, and Phar. Centralh.

Mercurial Ointment—Preparation.—To the many processes for the rapid preparation of this ointment the following, recommended by Mr. Phil. Hoglan, may be added: Mix 2 ounces of old mercurial ointment and 2 ounces of suet together. Add to the mixture 12 ounces of mercury in three separate portions, and triturate rapidly after each addition till the globules disappear, aiding the extinguishment of the mercury by adding during each trituration 15 drops of ether. For this process the author only required 15 minutes. Then add a melted and strained mixture of 4 ounces of suet and 6 ounces of lard, and triturate this mixture until cool.—Amer. Jour. Pharm., December, 1881, p. 604.

Referring to Mr. Hoglan's process, Mr. J. H. Redseeker observes that any rancid fat will answer as well as old mercurial ointment, but that either is objectionable, since the new ointment will soon become rancid throughout. To this objection Professor Maisch replies that *rancid* mercurial ointment is not absolutely necessary, since Buchner (1834) and more recently E. Dieterich (Proceedings, 1880, p. 42) have shown that a perfectly *fresh* ointment may be used quite as well for the extinguishment of the mercury.—Ibid., February, 1882, p. 55.

Mercurial Ointment—Rapid Preparation.—A correspondent of the "Pharm. Zeitsch. f. Russl." sends the following convenient method of making mercurial ointment: Rub 6 pounds of mercury, 6 ounces glycerin, 1 ounce water, and 1 ounce gum arabic, in a mortar until the mercury globules have disappeared; then add the other ingredients, as usual. The process requires about two hours.—Chem. Journ., March 17, 1882, p. 161.

Mercurial Ointment—Examination.—Instead of removing the fat by means of benzin, ether, or chloroform, C. Thein proposes the following process: 6 grams of the ointment are placed upon the bottom of a rather narrow test-tube; 2 or 3 grams of magnesium sulphate or other neutral salt are added with enough distilled water to nearly fill the test-tube, and the whole is heated until the fat which rises to the surface has become clear. The liquids are now allowed to cool, a splinter of wood being inserted in the fat, by means of which the latter after it has solidified may be easily lifted out of the test-tube after slightly warming it. The fat is then weighed, and the mercury, which has settled to the bottom, may likewise be weighed after washing it with a little ether or chloroform, to remove the last traces of fat retained by the metal.—Am. Jour. Pharm., June, 1882, p. 309, from Pharm. Ztg., No. 21, 1882.

Citrine Ointment—Preparation.—Mr. R. De Puy succeeds well in making the preparation by observing the following directions: Dissolve 4 ounces mercury in 12 fluidounces C. P. nitric acid. Heat 8 fluidounces neatsfoot oil and 2½ pounds (Av.? Rep.) lard to 180°; then add the dissolved mercury, all at once. Commence stirring and continue doing so until the ointment is cold or about the consistency of molasses. Towards the latter end of the process the vessel may be set in one containing cold water to hasten the cooling. The author wishes to impress the importance, in fact necessity, to stir continually from the beginning to the completion of the process. The product is bright lemon yellow, without disagreeable smell, and keeps well.—Can. Pharm. Jour., August, 1881, p. 3.

Diachylon Ointment.—Improved Formula.—According to Dr. L. A. Duhring, Mr. Eisner prepares an excellent diachylon ointment as follows: One part of freshly precipitated (from acetate of lead) pure white hydrated oxide of lead is rubbed with two parts of water, and mixed well with six parts of the best Lucca olive oil. It should be stirred for about two hours over a hot-water bath near the boiling-point, and cooled with constant stirring until the proper consistency is obtained. While cooling a drachm of oil of lavender to the half pound of ointment is added. This ointment contains a definite quantity of oxide of lead, has a neutral reaction, can be kept in a good condition for some time, and constitutes a smooth, whitish, elegant preparation.—Oil, Paint, and Drug Rep., July 13, 1881, p. 74, from Phil. Med. Times.

Unguentum Plumbi Hebræ—Preparation.—A. Popowski prepares Hebra's ointment as follows:

Finely powdered litharge 2 parts, olive oil 9 parts, and water 3 parts, are boiled together until the ointment is nearly white, when it is poured into a deep porcelain dish, and this is kept without disturbance at the temperature of a water-bath for 10 or 12 hours. The dish is then kept in a cool place; after solidification, the ointment is removed by slightly warming the dish, and the lowest and uppermost strata, which are impure, are removed. The pure middle translucent stratum is remelted without stirring, and poured into gallipots of suitable size; a layer of glycerin is poured upon the surface, and the ointment preserved for use in a cool place.—Am. Jour. Phar., August, 1881, p. 405, from Phar. Zeitsch. f. Russ.

Cold-Cream—Preparation.—A writer in "Drug. and Chem." (June, 1882, p. 247–248) discusses the conditions necessary to the production of a satisfactory cold cream. The most important is the thorough emulsification of the fats—that is to say, the production of a perfectly creamy mixture. This can be accomplished only by long-continued whipping of the mixture of fats and water. If this is properly done, the cold cream softens considerably; hence the preparations of the U. S. Pharmacopœia produce under these circumstances a cream which will pour readily from a jar, and which is evidently too thin for use. The writer recommends, therefore, the following proportions: Almond oil, 8 parts; rose water, 4 parts; wax, spermaceti, of each, 1½ parts. This will produce a satisfactory preparation if the conditions of emulsification, above described, are properly understood and complied with.

Glycerin Ointment—Permanent Preparation.—Glycerin ointment may be obtained of a soft consistence and perfectly permanent by preparing it, according to F. Katschinsky, from gelatin 1 gram, glycerin 96 grams, starch 144 grams, and a sufficient quantity of water.—Am. Jour. Phar., June, 1882, p. 309, from Phar. Zeitschr. Russl., 1881, No. 35.

Compound Resin Cerate—Modification of the Officinal Formula.—In view of the fact that this cerate has a tendency to become tough and inconveniently firm when long exposed to air, Mr. J. B. Moore has made some experiments, and proposes the following formula as a substitute for the officinal one: Resin, 12 troy ounces; yellow wax, 7 troy ounces; turpentine, 6 troy ounces; lard, 24 troy ounces; melt them together, strain the mixture through muslin, and stir constantly until cool.—Drug. Circ., January, 1882, p. 1.

Cantharidin Ointments and Plasters.—A writer in "Phar. Zeitschr. f. Russl." gives the following formula for preparing ointment and plasters from cantharidin, which are equal in strength to the corresponding preparations made from good powdered flies. The cantharidin is easily incorporated with the fats, etc., by dissolving it in acetic ether or chloroform, adding it to the wax heated to from 176° to 194° F., and stirring it for half an hour.

Emplastrum Cantharidum Perpetuum.—Resin, 500; yellow wax, 500; Venice turpentine, 370; pine resin, 330; beef suet, 200; powdered euphorbium, 60; and cantharidin, 1 part.

Emplastrum Cantharidini Ordinarium.—Yellow wax, 400; beef suet, 100; Venice turpentine, 100; and cantharidin, 1 part.

Unguentum Acre.—Lard, 5000; Venice turpentine, 1200; resin, 600; yellow wax, 300; powdered euphorbium, 200; cantharidin, 5 parts.

Unguentum Cantharidum.—Olive oil, 4000; yellow wax, 2000; cantharidin, 5 parts.

The mass, in each of the above cases, is made harder, so as to compensate for the powder that would, in the case flies were used, consolidate it.—Chem. Jour., June 16, 1882, p. 371.

Depilatory Pomade—Formula.—Carbonate of sodium, 1 drachm; quicklime, ½ drachm; charcoal powder, 8 grains; glycerin (neutral), 1 fl. drachm; lard, 7 drachms. After applying this pomade to the affected parts for 10 or 12 days, the skin takes a rose tint, and the hairs may be drawn out without pain.—Chem. and Drug., July, 1881, p. 292, from La Presse Medicale.

CHARTÆ.

Blistering Paper—New Process.—Mr. Limousin lately read a paper before the "Société de Pharmacie" upon a new method of making blistering-paper. A layer of ordinary blistering-plaster, about $\frac{1}{25}$th of an inch thick, is spread on a sheet of bibulous paper, and prepared with camphor in the usual manner. A second sheet is then laid over it and smoothed down. When required for use the sheet not in contact with the camphor is damped with a sponge dipped in warm water, and peeled off, the paper being previously cut to the proper size. Other plasters may be prepared in the same manner.—Chem. Jour., June 23, 1882, p. 387, from Rep. de Pharm., June, 1882.

Nitre Paper—Preparation for Fuming Inhalations.—Dr. Wm. Murrell draws attention to the value of fuming inhalations in the treatment of asthma, and observes that ordinary nitre-paper fails because it is not strong enough. He has successfully used very thick and strong nitre-paper (or tablets), containing both chlorate of potassium and nitre. Each consists of six pieces of white blotting-paper, about 6 inches square, and they are made by dipping them into a hot saturated solution of nitre and chlorate of potash. Before the pieces are quite dry they are sprinkled with Friar's balsam, spirit of camphor, tincture of sumbul, or some aromatic. The nitre-paper so prepared is as thick as cardboard, each piece consisting of six pieces of blotting-paper closely adherent, and covered all over with crystals of the salts used in its preparation. The door and windows having been closed, the tablet is folded down the middle, so as to make it look like a tent, and placed on a fire-shovel or piece of metal. It is then lighted at both ends, when it will burn very quickly, throwing out a flame 4 to 5 inches long, and giving rise to dense fumes.—Chem. and Drug., July, 1881, p. 295, from Brit. Med. Jour.

Logwood Paper—Preparation.—Krälzer recommends logwood paper as being more sensitive to acids and alkalies than litmus-paper. One part of logwood is macerated in 25 parts of cold water for 24 hours. The liquid is then filtered, and thick blotting-paper dipped in the filtrate and dried. The resulting test-paper is nearly colorless, but turns strongly blue with alkalies, and red with acids. He also recommends

Alkanet Paper, made from the ethereal tincture of alkanet root, for the same purpose.—Chem. Jour., June 16, 1882, p. 370, from Phar. Zeitsch. Russ., May and June, 1882.

COLLODIUM.

Cantharidized Collodion—Preparation from Cantharidin.—A writer in Phar. Zeitschr. f. Russl. gives the following formula: Pyroxylin, 30; ether, 400; spirits of wine, 70; castor oil, 10; cantharidin, 2 parts. The preparation corresponds in strength to that made, as ordinarily, from the powdered insect.—Chem. Jour., June, 16, 1882, p. 371.

Styptic Colloid—New Formula.—The following formula produces a preparation which instantly coagulates blood, forming a consistent clot, under which wounds will readily heal: Collodion, 100.0; carbolic acid, 10.0; tannic acid, 5.0; benzoic acid, 5.0. Mix the ingredients in the order named.

Gezow's Corn Cure—An Effective Remedy.—The following formula, which produces a clear, light-green solution, was recommended by M. Gezow, a Russian apothecary, in the "Zeitschrift für Russland:"

Extract of cannabis indica, ...	5 parts.
Salicylic acid, ...	30 "
Collodion, ...	240 "

Mix and dissolve.

It is applied with a camel-hair pencil, so as to form a thick coating, for four consecutive nights and mornings. The collodion at once covers and protects the corn from friction. The Indian hemp acts as an anodyne, and the acid disintegrates the corn, so that after a hot bath on the fifth day, it will come out adhering to the artificial skin of collodion on the toe. This causes no pain, and is said to be very effective. —New Rem., March, 1882, p. 85.

CONFECTIONES.

Confections—Conservation.—Mordagne recommends the addition of glycerin to confections for their preservation. The addition of 50 grams to 1 kilogram of the confections, leaving out a like quantity of the solvent, is sufficient. Theriak and Diascordium retained their odor and good physical character for three years after such treatment, and the same was the case with other confections.—Arch. d. Pharm., March, 1882, p. 224; from Jour. de Pharm. et de Chim. (5), iv, p. 561.

Confection of Sulphur—Improvement on the British Pharmacopœia Formula.—Mr. Peter Boa finds that the addition of a little tragacanth forms a confection of sulphur, which, with otherwise the same ingredients, will keep in perfect condition. while that prepared strictly according to the British Pharmacopœia soon separates a syrupy layer. The improved formula is as follows: Sublimed sulphur, 4 ounces; acid tartrate of potash, in powder, 1 ounce; tragacanth, in powder, 18 grains; syrup of orange-peel, 4 ounces (fluid?). Rub the powders together and mix thoroughly with the syrup.—Pharm. Jour. Trans., February 18th, 1882, p. 682.

Electuary of Pumpkin Seeds—A Pleasant Vermifuge for Children.—C. Slop von Cadenberg recommends the following: Pumpkin seeds, deprived of their testa, 30 grams, are beaten with water, 3 grams, until a pulpy mass is obtained, which is mixed with honey, 30 grams. It is to be taken in the morning in two doses, to be followed after several hours with 15 grams of castor oil.—Am. Jour. Pharm., September, 1881, p. 455; from Phar. Centralhalle, 1881, p. 284.

Ferrand's Laxative Electuary.—This is composed of flake manna, 30 grams; calcined magnesia, 4 grams; and clarified honey, 30 grams. It is used at the Laennec Hospital for phthisical patients, and is given in doses of a tablespoonful before breakfast.—Amer. Jour. Pharm., June, 1882, p. 308; from L'Abeille Méd., 1882, p. 24.

Cetraria Saccharata (Iceland Moss Sugar, Lichen Islandicus Saccharatus).—*Formula of the Dutch Society for the Advancement of Pharmacy:*

Iceland moss,	100
Sugar,	100
Water,	q. s.

Wash the Iceland moss thoroughly with water, press it, and then boil it for one hour with a sufficient quantity of water. Strain the liquid off, press out the residue, allow the united liquids to become clear by settling, and dissolve in the clear liquid the sugar. Then evaporate on a water-bath, under stirring, until the residue can be reduced to a fine powder. Preserve this in a well-closed vessel.

Another preparation follows the preceding, under the title:

Lichen Islandicus Saccharatus, Principio Amaro Orbatus (Iceland Moss Sugar, deprived of its Bitter Principle):

Iceland moss,	100
Potassium carbonate,	q. s.
Sugar,	100
Water,	q. s.

Mix the Iceland moss with a sufficient quantity of warm water, in every 375 parts of which 1 part of potassium carbonate is dissolved.

Let it stand for an hour, then wash the moss several times with cold water, and proceed as in the preceding.—New Rem., May, 1882, p. 74.

Soluble Cacao—Preparation and Composition.—Soluble cacao, which was first prepared in Holland, and is known as Dutch cacao, is prepared from the seed, deprived of fat by pressure, by digesting the press cake with sodium or potassium carbonate, which treatment renders cellulose, starch, and albuminoids more readily soluble in water. Otto Rueger prepares also soluble cacao mass which contains all the oil; the latter is first removed by pressure, the residue is treated as stated above, and the fat is afterwards added again. Thus prepared it contains a somewhat larger percentage of ash, but yields a palatable beverage simply by stirring with hot water, without boiling. This mass was found to contain cacao-butter, 47.73; nitrogenated compounds, 12.3; ash, 5.4; and in the latter alkaline carbonates, 2.25 per cent. Cacao powder, similarly prepared, contained fat, 30.45; nitrogenated compounds, 19.94; ash, 6.1; with alkaline carbonate, 2.78 per cent.—Am. Jour. Pharm., February, 1882, p. 64; Phar. Centralhalle, November 17th, 1881, p. 509.

Chocolate—Examination.—E. Herbert recommends the following: For the estimation of the sugar the chocolate, which has been previously deprived of fat, is extracted with boiling 50 per cent. alcohol as long as a brown-red color is imparted to the latter. The solution is evaporated to dryness, the residue taken up with water, the ensuing solution evaporated, and the residue dried at 100° C., in a current of illuminating gas, and calculated as sugar. The mass deprived of fat and sugar is then dried and weighed. On an average the pure cacao mass contains 50 per cent. of fat, and the amount of fat must, therefore, be nearly equal to half the weight of the chocolate, minus the amount of sugar. By the estimation of the ash, which should not amount to more than 2 per cent., mineral adulterations may be detected, while flour, chicory, acorns, etc., may be recognized by a microscopical examination.—Am. Jour. Pharm., May, 1882, p. 226, through Chem. Ztg., No. 12, 1882, p. 222; from Bad. Gew. Ztg., 15, p. 65.

Cachous—New Formula.—Dissolve extract of licorice root in warm water, 100 parts; add powdered catechu 30 parts, and gum-arabic 15 parts; evaporate in a warm bath to an extract, adding cascarilla bark, vegetable charcoal, orris root and mastic, of each 2 parts, and when nearly cold add peppermint oil 2 parts, tincture of ambergris and tincture of musk each 10 drops (parts = grams? Editor). Cut the mass into pieces of suitable size and shape. These will of course be black or dark-colored. It has recently been noticed that thymol has a powerful deodorizing effect on tobacco-smoke.—Am. Jour. Pharm., September, 1881, p. 455; from Canad. Phar. Jour.

DECOCTA ET INFUSA.

Infusion of Laminaria flexicaulis (see Iodine-yielding Algæ, under "Materia Medica") is prepared by Mr. James Wheeler by macerating 1 part of the dried and sliced fronds in 10 parts of water, with occasional stirring, for four hours, and then straining without pressure. Mr. Wheeler also gives a formula for:

Decoction of Laminaria saccharina, which is applied by him to the preparation of "Emulsion of cod-liver oil" (which see), and which directs that 1 part of the dried and sliced fronds be macerated for 4 hours, with occasional stirring, in 10 parts of water, then heating gradually to boiling, and continuing this until its viscidity is discharged. The decoction may be reduced to the consistence of an extract, or so dried as to yield a horny translucent mass; but in either of these conditions it loses some of its emulsifying power.—Phar. Jour. Trans., February 4th, 1882, p. 643.

Infusum Carnis Frigide Paratum (Cold-prepared Beef Tea)—*Formula of the Dutch Society for the Advancement of Pharmacy:*

Beef, free from fat, and very finely chopped,	500
Sodium chloride,	4
Distilled water,	q. s.
Diluted hydrochloric acid (specific gravity 1.050),	1

Macerate the beef for one hour with the sodium chloride, the acid, and 500 parts of distilled water, then strain through a cloth, and wash the remaining beef—without pressing—with sufficient distilled water, so that 500 parts of product are obtained.—New Rem., March, 1882, p. 73.

Purgative Infusion—Formula.—Dr. Perschke gives the following formula for a mild and pleasant purgative: Senna leaves, washed in alcohol, 16 grams; distilled water, 112 grams. Infuse three hours and add: Extract of buckthorn, 4 grams; sherry, 16 grams.—Chem. Jour., June 2d, 1882, p. 341; from Phar. Zeitschr. f. Russl., May, 1882.

EMPLASTRA.

Lead Plaster—Influence of Exposure.—The difficulty occasionally experienced when making Hebra's ointment, that the lead plaster and olive oil will not form a smooth mixture, has led Bernbeck to observe the effect of free exposure to air, and to air impregnated with ammonia, carbonic acid, and sulphydric acid. He found that a well-made plaster, when preserved in air-tight canisters, will invariably furnish a Hebra's ointment of proper consistence or condition, whilst the samples exposed, as above mentioned, soon lost their property of yielding a good ointment. Lead plaster should, therefore, be filled into tin canisters while in a molten condition and carefully protected from the action of air.—Pharm. Ztg., No. 78, 1881, p. 589.

Diachylon Plaster—Improvement.—Voraceck advises the addition of about a fortieth to a twentieth part of olive oil to the finished plaster mass, thereby preventing brittleness and cracking.—Chem. Jour., June 16, 1882, p. 370; from Pharm. Zeitschr. f. Russl., 1882.

ELIXIRS.

Elixirs and Syrups containing Ferric Hypophosphites.—C. Lewis Diehl communicated at the meeting of the Kentucky Pharmaceutical Association (held at Covington, in May, 1882 several formulas for syrups and elixirs, containing ferric hypophosphites, held in solution by the intervention of citrate of potassium. The ferric hypophosphite is prepared freshly from the calcium salt by precipitation with ferric chloride solution, care being exercised to avoid an excess of either compound. The moist magma is then immediately dissolved by the aid of citrate of potassium. The following are the formulas:

I. *Improved Syrup of the Hypophosphites with Iron.*—Take of hypophosphite of calcium, 256 grains; hypophosphite of sodium, 192 grains; hypophosphite of potassium, 128 grains; ferric hypophosphite (represented in the magma obtained from 128 grains of hypophosphite of calcium), 96 grains; citrate of potassium, 96 grains; white sugar, 13 troy ounces; orange-flower water, 1 fluidounce; distilled water, a sufficiency. Dissolve the calcium, sodium, and potassium hypophosphites in 7 fluid ounces of the water, if necessary, by the aid of a gentle heat, and filter the solution. Triturate the magma of the ferric hypophosphite with the citrate of potassium, add the solution of the other hypophosphites, and when complete solution is effected, the orange-flower water and sufficient distilled water to make the whole measure 9 fluid ounces. In this dissolve the white sugar, without heat, and filter the resulting syrup through paper. A fluid drachm of this syrup contains two grains of the calcium, a grain and a half of the sodium, one grain of the potassium, and three-fourths of a grain of the ferric hypophosphite.

II. *Syrup of Hypophosphite of Iron.*—Dissolve 128 grains of ferric hypophosphite (represented in the magma from 150 grains of hypophosphite of calcium), by the aid of 128 grains of citrate of potassium, in one fluid ounce of orange-flower water, and sufficient distilled water to make the solution measure 9 fluid ounces. In this dissolve 13 troy ounces of white sugar and filter the resulting syrup. One fluid drachm of this syrup contains one grain of the ferric hypophosphite.

III. *Elixir of Hypophosphite of Iron.*—In the 9 fluid ounces of solution of ferric hypophosphite, obtained as above (II), dissolve four troy ounces of white sugar and add five fluid ounces of alcohol in which eight drops of fresh oil of orange have been previously dissolved; then filter. The strength of this is the same as that of the syrup, over which it probably possesses no advantage.

IV. *Elixir of Hypophosphite of Iron and Quinine.*—Make a solution of ferric hypophosphite, as under II, but bring it only to the measure of 7 fluid ounces, and dissolve 4 troy ounces of white sugar in it. Triturate 128 grains of sulphate of quinine with 5 fluid ounces of strong alcohol, add a solution of 30 grains of hypophosphite of calcium in one-half fluid ounce of distilled water, and shake the mixture occasionally for an hour. Then filter, and wash the filter with sufficient strong alcohol to make the filtrate measure 7 fluid ounces. In this dissolve 8 drops of fresh oil of orange, add it to the solution of ferric hypophosphite, mix well, and filter. A fluid drachm of this elixir contains one grain of the hypophosphite of quinine and one grain of ferric hypophosphite.

V. *Elixir of Hypophosphite of Iron, Quinine, and Strychnia.*—This is the above elixir (IV) containing one one-hundred-and-twenty-eighth of a grain of hypophosphite of strychnia in the fluid drachm, and is made by triturating one grain of sulphate of strychnia with the sulphate of quinine and alcohol, and increasing the quantity of hypophosphite of calcium by one grain.

VI. *Elixir of Calisaya with Hypophosphites.*—This is the "elixir of calisaya" proposed by the author in 1866,* containing hypophosphites in such proportion that two teaspoonfuls represent one teaspoonful of "improved syrup of the hypophosphites with iron" (I). It is, therefore, necessary to reproduce the formula for the elixir of calisaya as modified for this purpose.

Take of calisaya bark, 24 troy ounces; curaçoa orange peel, 16 troy ounces; coriander, 4 troy ounces; cinnamon, 3 troy ounces; cardamom, 1½ troy ounces; anise-seed, 1 troy ounce; cocoa (Baker's), 8 troy ounces. Having reduced these ingredients to a moderately fine powder, displace them with a mixture of one volume of strong alcohol and three volumes of distilled water, until two gallons of percolate are obtained.

Meanwhile prepare from six pints of solution of tersulphate of iron, hydrated sesquioxide of iron by the formula of the "Pharmacopœia," measure the magma, and add to every four volumes one volume of strong alcohol; then add of this mixture sufficient to the percolate, obtained as above, to deprive it of its cinchotannic acid. The absence of the latter is readily ascertained by the addition of a drop of muriated tincture of iron to a filtered portion of the liquid, which should not be colored by such addition. Should coloration result, the intensity or faintness will serve as a guide to the further addition of the ferric oxide. As soon as detannation is effected, filter the whole through a *double* muslin cloth, express the residue under a press, filter this portion, add to that first obtained, and measure the united filtrate. Add to the residual magma on the cloth sufficient of the above-described mixture of alcohol and water to make, when again expressed and filtered, the united filtrates measure three gallons. Now triturate 2 fluid drachms of fresh oil of orange with 4 troy ounces of prepared chalk, incorporate this with the 3 gallons of detannated "cinchona liquor," and agitate occasionally for 24 hours and then filter.

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* Amer. Jour. Pharm., XL., p. 104.

The "cinchona liquor" so obtained is just twice the strength of the "elixir of calisaya" above referred to, and when mixed with an equal volume of "improved syrup of the hypophosphites with iron," forms the "elixir of calisaya with hypophosphites."

VII. *Elixir of Calisaya and Hypophosphites with Strychnia* may be made by dissolving one grain of strychnia by the aid of a few drops (or just sufficient) of hypophosphorous acid in one fluid drachm of distilled water, and adding sufficient of the above elixir (VI) to make one pint. A dessertspoonful contains one-sixty-fourth grain of strychnia. —Louisville Med. News, June 17, 1881, pp. 281–283.

Elixir of Blackberry.—Mr. R. F. Fairthorne offers the following formula for an elixir which, while possessing the astringent character of the blackberry, is not unpleasant to take:

Take of Fluid extract of blackberry,	f℥ivss.
Syrup of blackberry fruit,	f℥xv.
Jamaica spirit,	f℥xii.
Curaçoa cordial,	each f℥iv.
Cinnamon water,	
Syrup of orange peel,	f℥iii.
Oil of cloves,	each 12 drops.
Oil of allspice,	

Mix the essential oils with the fluid extract of blackberry, add the Jamaica rum, and afterwards the other ingredients.

Mr. Fairthorne also gives a formula for

Elixir of Logwood, which is as follows:

Take of Extract of logwood,	10 drs., 2 scr.
Brandy,	12 fluid ounces.
Curaçoa,	6 fluid ounces.
Syrup,	6 fluid ounces.
Oil of nutmeg,	each 4 drops.
Oil of cinnamon,	

Warm water sufficient to make 2 pints.

Dissolve the extract in the water, add the other ingredients, and, when cool, filter.—Amer. Jour. Pharm., June, 1882, p. 312.

Elixir of Phosphorus.—Mr. Charles T. George gives the following formula: Dissolve 10 grains of phosphorus in 10 fluid drachms of bromide of ethyl; add 8 fluid ounces of stronger alcohol and sufficient elixir of orange to make one gallon.

Elixir of Phosphorus, Quinia, and Strychnia is made from the above, 2½ grains of strychnia, and 64 grains of sulphate of quinia, by the aid of dilute sulphuric acid, in 1 pint of the elixir.—Amer. Jour. Pharm., July, 1881, pp. 379, 380; from Proc. Pa. Pharm. Assoc.

Elixir of Gentian and Chloride of Iron.—Mr. R. Du Puy finds that if extract of gentian, prepared after the formula of the U. S. P., be used in making this elixir, no difficulty will be experienced, whether employing the so-called tasteless, or the ordinary tincture of iron.—Can. Pharm. Jour., August, 1881, p. 4.

Curaçoa Cordial.—M. v. Valta communicates the following formula, which is stated to be used by large confectioners: Take of bitter orange (Curaçoa) peel, freed from pulp and cut, 15 parts; orange berries, bruised, 15 parts; 90 per cent. alcohol, 190 parts. Macerate, strain, and add milk, 10 parts; water, 80 parts. Filter and mix with simple syrup, 50 parts.—Amer. Jour. Pharm., January, 1882, p. 16; from Pharm. Zeitung, 1881, No. 72.

Elixir of Peptone—Formula.—A. Petit gives the following formula for an elixir of peptone (see "Albuminoids"):

Peptone,	5 parts.
Alcohol, 95 per cent.,	10 "
Frontignan wine (a superior Muscatel),	40 "
Sugar,	25 "
Water,	20 "

Dissolve the peptone in the water, add the wine and sugar, and filter. A tablespoonful (of 20 gm.) contains 1 gm. (15 grs.) of the peptone.—New Rem., March, 1882, p. 77; from Rép. de Pharm., 1881, p. 213.

Godfrey's Cordial—Improved Process.—Mr. J. B. Moore recommends the following: Mix 6 fluid ounces of brandy with 22 fluid ounces of boiling water in a half-gallon bottle. Rub one-half drachm of each oil of sassafras and oil of peppermint with 3 drachms of carbonate of magnesium; triturate the mixture with 8 fluid ounces of the hot menstruum, transfer to the bottle containing the remainder of the menstruum, and shake the whole vigorously and occasionally until cool; then filter, passing sufficient water through the filter to make 28 fluid ounces of filtrate. In this dissolve 1 troy ounce of bicarbonate of sodium, add

1 pint of New Orleans molasses and 1½ fluid ounces of deodorized tincture of opium. Mix well, and, if necessary, strain through muslin.—Drug. Circ., November, 1881, p. 161.

EXTRACTA.

Extracts of the New French Pharmacopœia.—M. Champigney draws attention to the character of the extracts proposed by the ninth sub-committee of the Société de Pharmacie, and criticises their action. The extracts prepared from the fresh plant are to be abolished, with the exception of the juices from Rhus radicans, anemone, hemlock, and aconite, thereby following in the footsteps of the compilers of the British Pharmacopœia. They base their decision on the researches of M. Bretet and others, who have sought to prove that the juice extracted by pressure or otherwise from the fresh plant has a much smaller value than the alcoholic or even watery extract of the dried plant; that the marc of the fresh plant is far from being exhausted, and will still give a certain amount of extract; that in many cases the marc contains even more of the alkaloids present in the plant than the juice or aqueous extract; and, finally, that the alcoholic extract contains more of the alkaloids than either. It is far from being proved, as asserted by some, that in the process of drying the plants lose a portion of their active principles, or that, by being dried, they are modified injuriously. The preparation of extracts from the green plants is often attended with great inconvenience, especially on account of their bulk and of being obliged to use them directly they are gathered. The ninth sub-committee has therefore proposed that, with the exceptions above referred to, there shall be only two classes of extracts, alcoholic and aqueous, both being made from the dried plant and with the portion containing most of the active principle. The extracts are also in all cases to be prepared by *displacement*. As far as consistence goes the sub-committee recommends the soft extract as the most convenient form. The sub-committee made some rather sweeping changes in the way of abolishing certain extracts, but the Society, with great prudence, has given a new lease of life to the extracts of wormwood, centaury, bittersweet, quassia, saponaria, and lettuce, which were condemned to death by the sub-committee. The new alcoholic extracts are those of belladonna, aconite, hemlock, henbane seed, jaborandi, and ergot. The new process recommended for the extract of opium is much simpler than the old one. The aqueous extract is evaporated down to a certain consistence, allowed to stand for twenty-four hours, and filtered, the residue left in the filter being washed with water, after which it is evaporated down to the condition of a soft extract. The extracts of cinchona, which are very numerous in the present Codex, are reduced to six: alcoholic extracts of the red, gray, and yellow barks, aqueous extracts of calisaya and gray barks, and a dry extract. The author very properly thinks that these six processes might with advantage be reduced to a single one, and made with water acidulated with hydrochloric acid, but the majority of the sub-committee thought otherwise. The process recommended was as follows:

Gray, yellow, or red bark, ...	100 parts.
Distilled water, ...	6000 "

Infuse coarsely powdered bark in boiling distilled water for six hours, express, filter, and evaporate to a syrupy consistence. Throw the residue into a displacement apparatus, and pour on it 1000 parts of water acidulated with 100 parts of hydrochloric acid, and after six hours continue the displacement with an additional quantity of water until a drop of the liquid is no longer precipitated by ammonia. Precipitate with ammonia, collect the precipitate on a filter, wash with water, and redissolve in the smallest possible quantity of a ten-per-cent. solution of hydrochloric acid. Add to the syrupy extract, and evaporate to a proper consistency over a water-bath. The great objection urged against the process was that by using hydrochloric acid the natural alkaloidal salts existing in the bark were not obtained, and that by using another solvent besides water, the therapeutical properties of the preparation were changed. These considerations carried the day, and the new Codex will be incumbered with six extracts of bark instead of one.—New Rem., May, 1882, p. 151; from Rep. de Pharm.

Extract of Licorice—Examination.—Mr. H. P. Madsen has subjected eight samples of extract of licorice, designated in the following as *A*, *B*, *C*, *D*, *E*, *F*, *G*, and *H*, respectively, to qualitative and quantitative examination. The last of these samples (*H*) was an extraction of

SAMPLE.	Percentage of water contained.	Percentage of the dried, in water insoluble, residue.	Percentage of dry extract contained.	Percentage of precipitate obtained by alcohol from aqueous extraction.	Percentage of Ash.	Percentage of Sugar.	Percentage of Arabin.
A, . .	16.50	17.95	65.55	31.00	12.41	14.48	3.32
B, . .	15.00	25.40	59.60	33.10	9.13	15.17	4.36
C, . .	12.60	25.15	62.25	30.10	6.26	15.11	2.43
D, . .	14.35	21.10	64.55	26.65	6.60	11.09	1.52
E, . .	14.50	34.50	51.00	45.60	6.06	10.09	10.49
F, . .	11.45	26.95	61.60	43.00	14.23	10.82	9.13
G, . .	10.50	37.50	52.00	30.50	6.34	7.33	8.39
H, . .	31.56	traces.	68.44	19.00	7.27	12.84	1.19

licorice root with cold water in the ordinary extract form, and recently prepared. The other seven all bore the mark "Baracco," and with the single exception of *A*, which was in brick-shaped pieces, weighing 5 kilograms each, were of the usual cylindrical stick form. All of these commercial samples were shiny, and, with the exception of *A* and *G*, which were very tough, were friable. The foregoing table shows the results of the examinations made.

A brief account of the manner in which these results were obtained, and particularly of the author's methods of determining the sugar and arabin, may properly find place here: (1.) The percentage of water was ascertained by heating samples of each for 15 hours at 100° C. (2.) The ash, by incineration. (3.) The insoluble residue by macerating ten grams of the sample in 100 grams of water for 12 hours, filtering, washing the residue with 200 grams more of water, and drying at 100° C. (4.) The amount of dry extract was calculated by subtracting the sums of the moisture contained and the insoluble residue from the weight of the sample employed. (5.) The aqueous solutions, obtained as above, were then evaporated with the washings to 100 grams, and each of them was precipitated by an amount of alcohol (sp. gr. 0.830), equal to four times the volume of the licorice solutions, the precipitate collected, washed with alcohol until the latter passed colorless, and then dried at 100° C. and weighed. (6.) The sugar determination was made with a copper solution, having the following composition: 34.639 grams cryst. cupric sulphate; 200 c.c. distilled water; 100 grams glycerin; 480 c.c. solution of soda; the whole diluted to 1000 c.c. A weighed sample of each licorice solution was boiled with this copper solution, and quickly filtered, and washed with boiling water, after which the cuprous oxide, converted into cupric oxide, was calcined with the necessary precautions. (7.) The amount of gum was determined as follows: The aqueous liquid obtained from 10 grams of the extract, as under (3), was treated with alcohol, as under (5), until all sugar reaction disappeared. The precipitate was then dissolved in as little water as possible, and cupric sulphate solution (1 : 9) and solution of soda added. About 50 c.c. of the former was required for complete precipitation of the copper gummate, and the soda solution was added to strong alkalinity. The precipitate was collected on a filter, first washed with a little distilled water to expel the strong sodic hydrate; then with dilute solution of soda until the filtrate passed colorless. The albuminates and coloring matters are thus removed completely. The precipitate was then dissolved upon the filter itself in diluted hydrochloric acid, and precipitated by alcohol, by which means the arabin was separated in white lumps. It was finally washed and dried. The method gives approximately correct results.

The results obtained by Mr. Masden show that gum must be expected in all extracts of licorice, since it is present even in the sample *H*, made by macerating licorice root in cold water. The sample *D* nearly agrees with *H*, when one bears in mind that *H* contains 31.56 per cent. water, whilst *D* only contains 14.35. The large amount of gum in *A* is accounted for by the fact of the root being exhausted by steam. In the cases of *E*, *F*, and *G*, there is little doubt that they contain gum intentionally added. Microscopic examinations also revealed that whilst *A*, *B*, *C*, and *D* contained only deformed starch-granules, which must be supposed to be the starch of the root itself, *E*, *F*, and *G* also contained whole and unaltered starch-granules, and *E* only potato starch, whereas *F* had a mixture of wheat and potato starch. In *G* the starch appears to be added to the warm extract solution, by which a part is swelled up. *H* contained, besides the remains of cells and deformed starch-granules, crystals of sugar.—Yearbook of Phar., 1881, pp. 517–527.

Extract of Malt—Preparation.—Mr. Thomas T. Goodale contributes a very interesting paper on the preparation of extract of malt, from which the following is a brief abstract. Scrupulous cleanliness is of first importance. Having selected sound malt, and of the best, it should be ground or crushed in such manner that while the fleshy part is completely crushed the husk is simply loosened. In order to obtain a concentrated and bright liquor, the saccharine and amylaceous matter must be extracted, must be exhausted with the smallest amount of water and maintained at a proper degree of heat. The grain will be completely exhausted by one washing, if successfully conducted. Failure may result from two causes: when a mucilaginous mass is formed in consequence of too elevated a temperature, or when the grain is too fine. The mashing apparatus which was found most convenient, is a tub similar to that used by brewers, smaller at the bottom than at the top, with a finely perforated bottom fitted to it, and provided with a faucet between the true and false bottoms. The tub is provided with a mechanical mixer. The temperature of the mashing is 160° F., and care must be exercised to keep the mash at that temperature, the malt being stirred into the water previously heated to 165° F., and the temperature then maintained at 160° F. The whole is allowed to remain, closely covered, for two hours, after which the liquor is carefully drawn off at the faucet. When drained completely, water at 160° F. is sprinkled on the grain, allowed to remain for about half an hour, and again drawn off. It may be necessary to repeat this once more, but in this case the liquor from the first mashing is returned to the mash-tub for this purpose, and when this, after an hour, has again been drained, sufficient water is sprinkled on the grain to completely force out the liquor held by the grain. If the process has been successful, the liquors will have the exact color of the grain used, will have a fine head, be finely flavored, and effervesce. It must be perfectly clean and bright. It then only requires concentration. This may be accomplished in two ways: the one by evaporation, which is mostly done in very shallow pans, but is preferably done by heating the liquor to 80° or 90° F. in a deep kettle in which a wooden roller is fastened, over which and another fastened at a suitable height above, a band of cloth is allowed to revolve by the aid of suitable mechanism (as originally suggested by Dr. Squibb. Rep). In this way, very rapid evaporation is secured at a low temperature, and a product of very light color is secured. The other is a freezing process,* which, avoiding heat, completely yields an exceptionally superior product. The operation is conducted as follows: The clear liquid, when cold, is frozen in an ordinary ice-cream freezer. The ice-cake is then broken, placed in a strong canvas bag, and firmly pressed in a tincture press. The expressed liquid is again frozen and pressed, and this is continued until a syrupy liquor is obtained, which will be reduced to the proper consistence by placing it in the drying-closet for about an hour. The ice-cakes resulting from the above are pressed again until the liquor passes white, and the liquors so obtained are subjected to the same method of alternate freezing and pressing.—New Rem., March, 1882, pp. 70–71.

Extract of Malt—Test of Quality.—When properly prepared, extract of malt should contain an abundance of unchanged diastase. Hager proposes that the latter shall be present in such quantity that 100 parts of the extract shall convert at least 10 parts of starch into sugar during 5 hours digestion, at 50° to 60°, the test being made as follows; 0.1 gram of dried starch is mixed with 5 c.c. cold and then with 50 c.c. hot water; a solution of 1.5 gram of the malt extract in 19 c.c. of water, neutralized with a little carbonate of magnesium, is then added, well mixed, and a thermometer introduced into the mixture. The vessel is then placed in a sand-bath, which is heated by a water-bath, and the temperature of the mixture maintained at 50° to 60° C. by raising or lowering the vessel in the heated sand. After 5 hours the presence of starch should no longer be evidenced on the addition of iodine.—Arch d. Pharm., October, 1881, p. 297, from Pharm. Centralh., 1881, No. 33.

Extractum Krameriæ—Causes of Variability of Commercial Samples.—Prof. E. A. Vander Burg has made a number of experiments with the view of determining the causes of the different behavior of commercial extract of rhatany. The Peruvian root exhausted by cold water yielded 10.5 per cent., and by decoction 18.5 per cent. of extract, while Savanilla rhatany gave 14.75 and 20.50 per cent. Of these extracts that of the Peruvian root, prepared with cold water and by evaporation *in vacuo*, was of a light-red color (not brown), readily and completely soluble in water, had the strongest astringent taste, and gave the strongest reactions for tannin; a one-per-cent. solution yielded with lead acetate a nearly white, slightly rose-colored precipitate, with ammonia a bright blood-red color, and with lime-water a light-red precipitate. The corresponding reactions with the other extracts were mostly much darker, as were also the precipitates with cinchonine sulphate and with tincture of iodine. For the preparation of *syrupus iodotannicus* 0.1 gram iodine was dissolved in 2 c.c. alcohol, of spec. grav. .828, and the solution mixed with 0.4 gram of extract, previously triturated with 4 c.c. water; with the extract prepared by cold water and evaporation *in vacuo* the reaction of free iodine had completely ceased in 24 hours, while it was still evident with all the other extracts after six weeks, evidently due to the decomposition of a portion of the tannin during the preparation.

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* This process was originally suggested by Professor Alphonse Herrera for the concentration of vegetable juice.—Rep. See. Proceed., 1878, p. 95.

No characteristic difference could be observed between the extracts prepared from the cold infusion by evaporation at the ordinary temperature, in the water-bath or over the naked fire; nor between the extracts prepared from decoctions of the root and evaporated in the manner indicated; the latter extracts were invariably dark in color, and with reagents yielded the darkest-colored reactions. The Savanilla extracts were always darker than the corresponding extracts from Peruvian rhatany. Commercial extractum krameriæ americanum agreed in all respects with the extract obtained from Savanilla rhatany with cold water; but the commercial rhatany extract "in lamellis" differed to such an extent from all extracts prepared from Peruvian and Savanilla rhatany, as to warrant the inference of its being prepared from an entirely different drug; it has no astringent taste, is but slightly soluble in strong alcohol, its aqueous solution yields a strong precipitate with alcohol, and the precipitates with all reagents had a color differing materially from the precipitates obtained with the other extracts.—Am. Jour. Pharm., March, 1882, p. 117, from Phar. Ztg., 1881, No. 103; N. Tydschr. voor. Phar., October.

Extract Secale Cornut.—Fault in the G. P. Formula.—W. Salzer regards the formula of the German Pharmacopœia to be a good one, but faulty in that it directs the evaporation of the infusion to the consistence of this syrup, in consequence of which the alcoholic precipitant is diluted to a greater or less degree, according to the judgment of the operator as to what constitutes a thin syrupy consistence. He advises that the infusion be evaporated to a definite weight—which should be established by experiment—and then mixed with a proper quantity of strong alcohol.*—Pharm. Ztg., No. 95, 1881, p. 710.

Extract of Nux Vomica—Care requisite when removing the fixed oil. —See *Nux Vomica*, under "Materia Medica."

Extract of Aconite.—Preparation in England from *Aconitum Paniculatum*, instead of A. Napellus.—See *Aconitum Paniculatum*, under "Materia Medica."

Extract of Wormwood—Formation of Crystals of Chloride of Potassium.—E. Claassen has found perfectly transparent yellowish crystals, which proved to be potassium chloride, in the extract of Artemisia Absinthium, *Lin.* The crystals were of great regularity of form and were combinations of the cube and octahedron, in some of them with a predominance of one of the forms.—Am. Jour. Pharm., June, 1882, p. 310, from Amer. Jour. of Science, April, 1882, p. 323.

Extract of White Ash Bark.—Mr. H. M. Edwards has prepared an extract from the bark of *Fraxinus Americana* (which see), with 20 per cent. alcohol, which yielded 29.12 per cent. It is of a blackish-red color and has an extremely bitter and burning taste.—Am. Jour. Pharm , June, 1882, p. 284.

Quillain.—This name is suggested by Mr. S. A. McDonnell as being short and expressive, for the dry extract of quillaya bark, in connection with formulas for emulsions proposed by him, which see under *Misturæ.*

Desiccated Ox Blood—Therapeutic Value.—Dr. Le Bon says that desiccated ox blood and hæmoglobin has been thoroughly tried in the Paris hospitals and found very efficacious in debilitated patients. It is indicated in those cases that require raw meat, iron, or the phosphates. The elixirs or wines sold as containing the essential principles of blood or meat are of comparatively little value, and are devoid of the nutritive properties contained in the albuminoid principles which are so essential.—Am. Jour. Pharm., September, 1881, p. 447, from Med. Times and Gazette.

EXTRACTA FLUIDA.

Fluid Extracts.—Apparatus for their preparation without heat, see *New Displacement Apparatus*, under "Apparatus and Manipulations."

Fluid Extracts—Formulas.—Mr. Adolf G. Vogeler communicates the following formulas for fluid extracts, about which our books give no account, which have furnished preparations apparently superior to those purchased from the wholesaler:

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* This suggestion has already been made by C. Lewis Diehl, in a paper on Ergotin, read before the Ky. Pharm. Assoc., in 1880.—See Proceedings A. P. A., 1881, 69–70.

Fluid Extract of Quebracho (Aspidosperma Quebracho).—Take of quebracho bark, in fine powder, 16 troy ounces; alcohol, 8 fluid ounces; water, 7½ fluid ounces; glycerin, 4 fluid drachms. Proceed according to the general directions of the U. S. P., continuing the percolation with diluted alcohol. Reserve the first 14 fluid ounces of the percolate, and continue until 10 fluid ounces more are obtained. Add the glycerin to the second percolate, evaporate to the measure of 2 fluid ounces, and mix with the reserved liquid.

Fluid Extract of Betony (Betonica officinalis).—Take of betony, in fine powder, 16 troy ounces; diluted alcohol, q. s. Proceed according to the directions of the U. S. P.

Fluid Extract of Yerba Santa (Eriodictyon Californicum).—Take of yerba santa, in fine powder, 16 troy ounces; alcohol, 95 per cent., 6 fluid ounces; water, 1½ fluid ounce; glycerin, 4 fluid drachms. Proceed as under fluid extract of quebracho, but continue the percolation with a mixture of 3 measures of alcohol and 1 measure of water, instead of diluted alcohol.

Fluid Extract of Eucalyptus (Eucalyptus Globulus).—Take of Eucalyptus, in fine powder, 16 troy ounces; alcohol, 95 per cent., q. s. Proceed according to the general directions of the U. S. P.

Fluid Extract of Hop.—Take of hop, in fine powder, 16 troy ounces; diluted alcohol, q. s. Proceed according to the general directions of the U. S. P.

Fluid Extract of Poke Root (Phytolacca Decandra).—Take of poke root, in fine powder, 16 troy ounces; alcohol, 95 per cent., q. s. Proceed according to the general directions of the U. S. P.

Fluid Extract of Cascara Sagrada (Rhamnus Purshiana).—Take of cascara sagrada, in fine powder, 16 troy ounces; alcohol, 95 per cent., 8 fluid ounces; water, 5 fluid ounces; glycerin, 3 fluid ounces. Proceed as under fluid extract of quebracho, adding, however, 1 fluid ounce of glycerin to the second percolate instead of ½ an ounce.

Fluid Extract of Black Haw (Viburnum Prunifolium).—Take of black haw, in fine powder, 16 troy ounces; alcohol, 95 per cent., 8 fluid ounces; water, 7½ fluid ounces; glycerin, 4 fluid drachms. Proceed as under fluid extract of quebracho.—The Pharmacist, October, 1881, pp. 370–372.

Fluid Extract of Jamaica Dogwood (Piscidia Erythrina)—*Formula.* —Mr. Joseph L. Lemberger states that Jamaica dogwood is an article of commerce now, and readily obtainable, and offers a formula for its preparation. Only the gray variety and bark of the root should be used. Forty-eight troy ounces of the bark, in powder No. 8, is moistened with sufficient of a mixture of 3 pints of alcohol, ½ pint of glycerin, and ½ pint of water; it is packed in a percolator, allowed to stand for six hours, and then percolated with the menstruum until 3 pints of percolate are obtained. A dark wine-colored preparation is thus obtained, which possesses the full properties of the drug, and is apparently double the strength of some of the fluid extracts of Jamaica dogwood in the market. The dose is 1 fluid drachm.—Drug. Circ., December, 1881, p. 179.

Aqueous Fluid Extract of Hydrastis.—In view of the recent introduction by certain manufacturers of aqueous preparations of hydrastis, under various names, Mr. C. S. Hallberg has undertaken some experiments, which show that:

1. Aqueous extract of hydrastis is not a true representative of the drug, as the berberine is only partially extracted.
2. Alcohol, or alcohol and water, exhaust hydrastis more completely than water alone.
3. Hydrastis, in common with other roots and rhizomes containing berberina, should be exhausted with diluted alcohol.—The Pharmacist, March, 1882, pp. 85–87.

Fluid Extract of Chinese Tea—Preparation.—Mr. R. F. Fairthorne communicates the following process to "Amer. Jour. Pharm:"

Best imperial tea,	32 troy ounces.
Glycerin,	8 fluid ounces.
Water,	8 fluid ounces.
Alcohol,	16 fluid ounces.
Diluted alcohol,	q. s.

To the tea, in fine powder, add sufficient of the mixture of the liquids to moisten it, and pack it in a percolator; pour in the remainder of the menstruum, and let it stand four days. Then continue the percolation, using diluted alcohol until 24 fluid ounces have been received. Remove the mass from the percolator, and add to it 1 gallon of boiling water. After macerating twenty-four hours, express, filter, and evaporate to 8 fluid ounces, mix with the percolate, and filter.

This fluid extract has been found to exceed either coca or guarana in relieving headache.—New Rem., April, 1882, p. 113.

Fluid Extract of White Ash Bark.—Mr. H. M. Edwards has prepared a fluid extract from the bark of *Fraxinus Americana* (which see) with a menstruum composed of water 11 parts, glycerin 1 part, and alcohol 4 parts, which was deep red or blackish-red, very bitter, and slightly pungent.—Amer. Jour. Pharm., June, 1882, p. 284.

GLYCERITA.

Glycerinum Acidi Gallici—Caution Relative to Formation of Pyrogallol.—Mr. T. E. Thorpe had shown in a previous paper (see "Proceedings," 1881, p. 324), that in the presence of glycerin the conversion of gallic acid into pyrogallol takes place very rapidly at a temperature of 190° to 200° C. He now cautions against employing too high a temperature when making the glycerite of gallic acid, since the conversion of a portion of it into the highly poisonous pyrogallic acid may be attended with serious consequences.

In the discussion following the reading of this paper it was remarked that the direction to employ *a gentle heat* for making the glycerite would probably prevent the use of a sufficiently high heat to cause the conversion. It is not known, however, to what extent prolonged exposure at a lower temperature may cause the formation of pyrogallic acid, and in this direction experiments will be necessary. Professor Thorpe thought that the solution might be made with perfect safety at a temperature of 100° C.—Yearbook of Pharm., pp. 469–472.

Glycerol of Thymol.—The following formula is recommended by Dr. Besnier in pityriasis: Thymol, 1.0; glycerin, 25.0; alcohol, 25.0; water, sufficient to make 500.0.—Am. Jour. Pharm., November, 1881, p. 577.

Glycerite of Bismuth.—This is best prepared, according to A. Bareau, by triturating the bismuth salt intimately with the requisite quantity of starch and about 5 or 6 parts of water, and adding this mixture, with continual agitation, to the glycerin, previously heated to near the boiling-point.—Am. Jour. Phar., March, 1882, p. 116; from L'Union Phar.

Glycerol of Myrrh and Borax.—The following formula is recommended by Mr. R. F. Fairthorne for a preparation which commends itself for many purposes, and will be found especially serviceable as an addition to gargles and toothwashes, and as an application to sore nipples. It is made by the annexed formula:

Take of Myrrh (in coarse powder),	1 ounce.
Powdered borax,	1½ ounce.
Glycerin,	
Water,	each 3 fluid ounces.

Mix the borax and myrrh together, add the other ingredients, and boil in a flask for ten minutes; strain through muslin, and add enough water to make the mixture measure 6 fluid ounces; when cold, filter through cotton or paper.

When this glycerol is diluted with decoction of quillaia bark and flavored with oil of rose or other essential oil, an elegant

Mouth Wash is obtained—the following being a very satisfactory formula:

Take of Glycerol of myrrh and borax,	f℥ii.
Decoction of quillaia (2 ozs. to Oi),	f℥iv.
Oil of rose,	4 drops.
Oil of cloves,	6 drops.
Oil of orange peel,	6 drops.

Mix and filter.

—Amer. Jour. Phar., June, 1882, p. 312.

Glycelæum—A New Emulsifying Agent.—Referring to a paper on glycelæum, read fourteen years ago at the Dundee meeting of the British Pharmaceutical Conference, Mr. T. B. Groves again draws attention to this subject. He now finds that glycelæum is an excellent emulsifying agent, and that ¾ of an ounce will readily emulsify 1½ ounce of most oils, while castor oil refuses to emulsify. Spirit of turpentine, paraffin oil, benzol, and such bodies are somewhat stubborn, but by using the mortar and pestle they can be made to form glycelæa, containing about two-thirds of their bulk of the respective oils. Certain substances cannot be combined with these glycelæa except in very limited quantities, such as wood-tar, carbolic acid, creasote, Peruvian balsam. The glycelæum, described by the author in his former paper, was prepared with sweet-almond cake and concentrated glycerin; he now finds it advantageous to dilute the glycerin with water, and, owing to the difficulty to obtain sweet-almond cake, uses that of the bitter almond, the following being the proportions:

Finely powdered bitter-almond cake,	1½ ozs.
Pure glycerin,	2 ozs.
Water,	1 oz.

Mix.

Certain inert powders, such as prepared chalk or licorice powder, have the effect of breaking up the combination, and the constituents of the glycelæa assume their original liquid form. Tannic acid and oxide of zinc act chemically as well as mechanically to produce the same result.—Yearbook of Phar., 1881, pp. 495–497.

LINIMENTS.

Linimentum Saponis.—Improved Process.—Mr. Charles T. George suggests the following formula for preparing soap liniment: Dissolve camphor ℥ii, in alcohol Oii; add oleic acid ℥ii and oil of rosemary f℥ss; then gradually add sodium bicarbonate ʒv, and when effervescence has ceased, add water f℥vi and filter. It will not deposit in cold weather. —Am. Jour. Pharm., July, 1881, p. 379, from Proc. Pa. Pharm. Assoc.

LIQUORES.

Fowler's Solution—Prevention of Mould, change by Age, etc.—The algaceous growth frequently observed in this solution is entirely prevented, according to Perschne, by replacing one-fourth of the water with glycerin.—Am. Jour. Pharm., September, 1881, p. 456, from Pharm. Zeitsch. f. Russland, 1881, p. 397.

Dannenberg does not regard the algaceous growth, occasionally observed in this liquid, as being of any importance concerning the arsenic present; but he directs attention to the gradual oxidation, in partly filled bottles, of the arsenious to arsenic acid, as was shown by Fresenius many years ago. According to Frerichs and Wœhler arsenic acid is far less poisonous than arsenious acid, and it is obvious that it cannot be immaterial which of the two compounds is present. Fowler's solution should be prepared only in small quantities and preserved in well-stopped vials.—Ibid., November, 1881, p. 574, from Phar. Centralhalle, 1881, p. 319.

Solution of Arsenic Acid—Preparation.—The following formula has been adopted by the Dutch Society for the Advancement of Pharmacy: Arsenious acid, 4; hydrochloric acid, 1; nitric acid, 9; water, q. s. Boil the acids together, in a glass-flask, until a small sample of the liquid, neutralized with potassa, is no longer colored green by addition of solution of bichromate of potassium. Then evaporate the liquid in a porcelain capsule on the water-bath, until acid vapors are no longer given off, and the liquid has acquired a syrupy consistence. Finally, add distilled water to make the product weigh 80 parts. It contains 5.75 per cent. of arsenic acid.—New Rem., January, 1882, p. 10.

Liquor Stibii Chlorati—(Butter of Antimony)—Modification of Process.—This preparation of the German Pharmacopœia is of variable composition owing to the impurities present in the crude material. Prof. E. Reichardt recommends the following process for its preparation: 1 part of powdered sulphuret of antimony is mixed in a capacious flask with 4 parts of crude hydrochloric acid, and the mixture gradually heated to boiling, and until sulphuretted hydrogen is no longer evolved in the presence of undecomposed black antimony. The liquid is filtered, diluted with 6 volumes of water, the precipitated antimony oxychloride washed upon a filter with water and dried between 20° and 30° C. One part of the air-dry powder is treated for 24 hours with 3½ parts of pure hydrochloric acid, and with frequent agitation, but without heat, when the liquid is filtered; the proper specific gravity 1.34 to 1.36, is obtained either by dilution with hydrochloric acid or by evaporation in a water-bath. Thus prepared it is a colorless or pale yellowish liquid, which is completely volatilized by heat, and when diluted with 5 parts of water yields a perfect solution on the careful addition of sulphuric acid (absence of lead). Treated with an excess of ammonia and filtered, the liquid is clear and not blue (absence of copper). When heated to 50 or 60° C. (122° to 140° F.) a current of sulphuretted hydrogen should not cause the separation of either sulphur or sulphide of arsenic.—Am. Jour. Pharm., March, 1882, p. 116, from Archiv d. Pharm., November, 1881, p. 347.

Liquor Ferri Oxychlorati—Formula.—Dr. C. Schacht communicates the following formula for a solution of ferric oxychloride, which furnishes a perfectly "pure" preparation, and a substitute for dialyzed iron: 485 parts of liquor ferri sesquichlorati (Ph. Ger.) are diluted with 4250 parts of distilled water, and the mixture is poured, with constant stirring, into dilute ammonia-water, composed of 580 parts of liquor ammonii caustici and 2500 parts of distilled water. The precipitate is collected on a linen cloth, washed completely, expressed carefully, mixed with 60 parts of hydrochloric acid, allowed to stand three days, and diluted to the sp. gr. 1.046 at 15° C. It contains 5 per cent. of ferric oxide, is clear, brown-red and odorless, and has a very slightly astringent taste. When 1 part is diluted with 19 parts of distilled water, no turbidity is observable by transmitted light after the addition of 1 drop of nitric acid and 5 drops of $\frac{1}{10}$ nitrate of silver solution. The preparation is absolutely identical with dialyzed iron.—Pharm. Ztg., No. 13, 1828, p. 92.

A writer in the same journal (No. 16, p. 115) criticises Dr. Schacht's formula. He believes the method recommended by Dr. Hager, to saturate a solution of ferric chloride with ferric oxide, to be the more rational one, though Dr. Schacht's method may accomplish this object more rapidly. He has, however, found difficulty in making the preparation by Dr. Schacht's process, which he attributes to an insufficiency of ammonia prescribed. The 485 parts of solution of ferric chloride (contains 45 per cent. ferric chloride) requires 687 parts of officinal (Ph. G.) liquor ammon. caust. for complete precipitation, whereas the above formula directs only 580 parts. A sufficient quantity should be directed.

Dr. B. Hirsch (Ibid., No. 17, p. 124), commenting on the formula proposed by Dr. Schacht, observes that he in all probability intends the liquor ferri sesquichlorati proposed for the new German Pharmacopœia, which is to contain only 10 per cent. Fe instead of 15 per cent. as now. With such a solution, the process appears to afford satisfactory results.

Solution of Citrate of Magnesia—Modified Process.—Mr. Robert F. Fairthorne suggests the following formula, which not only produces a perfectly clear preparation, but is also entirely free from the earthy taste which the officinal preparation has (? Rep.), and which he attributes to the use of carbonate of magnesium: Dissolve 4 troy ounces, 1 drachm, and 45 grains of citric acid in 20 fluid ounces of hot water; add 7 drachms and 55 grains of light calcined magnesia, and when solution is effected, 6 troy ounces of sugar, 1 drachm and 40 grains of bicarbonate of sodium, 3 drops oil of lemon, and sufficient cold water to make 50 fluid ounces; then filter, divide into five suitable bottles, add to each 40 grains of bicarbonate of potassium, and cork tightly as usual.—Am. Jour. Pharm., February, 1882, p. 67.

Solution of Gum Arabic—Decolorization.—A solution, after being filtered through calico, is mixed with freshly precipitated hydrate of alumina in the wet state, and then filtered through a linen cloth, when a colorless gum solution will result. By filtering gum solution through a layer of freshly precipitated alumina, it can also be decolorized greatly, and by repeating the filtration several times, a quite colorless liquid is obtained.—New Rem., February, 1882, p. 37.

Mucilage of Gum Arabic—Cause and Prevention of Thickening.—It has frequently been observed that some sorts of gum arabic form with water a thicker mucilage than others. By heating to 203° F. before dissolving the gum this trouble may be avoided. Vorder states, that he has obtained a good mucilage from such gum, by allowing the thick liquid to stand over night in a warm place. Madsen obtained from an apparently good sample of gum arabic a mucilage, which gradually thickened, and finally became so thick that it could no longer be poured. The gum was found to contain comparatively little potassa and water.—Arch. d. Pharm., November, 1881, p. 384; from Phar. Jour. Trans.

Clear Solution of Caoutchouc—Preparation.—Dr. Eder and V. Tóth give the following directions: Inclose 30 grams of finely cut caoutchouc in a capacious linen bag, and suspend this within a flask containing 1 liter of benzin, by means of a thread held fast by the stopper so that the bag remains near the surface of the liquid. In the course of six or eight days the soluble portion of the caoutchouc, about 40 to 60 per cent., will pass into the benzin, while the contents of the bag will swell to an enormous size. The clear limpid solution, which is quite viscous, and contains 1.2 to 1.5 per cent. of caoutchouc, is then carefully separated. The swelled contents of the bag retain ¼ to ⅓ of the benzin used, and may be utilized for the preparation of an inferior grade of caoutchouc varnish. The authors also state that a solution of caoutchouc in benzin, kept in half-full bottles, is decomposed on exposure to light, which may be seen by the change of the solution from a viscous to a thin fluid condition. Even in the dark this change goes on, but it requires about three times as much time.—New Rem., October, 1881, p. 304.

Compound Solution of the Hypophosphites of Iron, Soda, Lime, and Magnesia—Preparation.—The popularity of the hypophosphites, particularly as a substitute for the phosphates, during the last two or three years, has led Mr. Adam Gibson to communicate a process for making a combination containing ferrous hypophosphite and, as a substitute for the potassium compound usually contained in similar preparations, magnesium hypophosphite. The working formula is as follows: 2 ounces 382 grains ferrous sulphate ($FeSO_4.7H_2O$); 5 ounces 364 grains sulphate of sodium ($Na_2SO_4,10H_2O$); 2 ounces 22 grains sulphate of magnesium ($MgSO_4,7H_2O$); 10 ounces 43 grains hypophosphite of calcium; 5½ fluid ounces hypophosphorous acid containing 30 per cent. of acid ($= HPH_2O_2,70H_2O$).* Dissolve 6 ounces and 112 grains of the hypophosphite of calcium in 50 ounces of water; bring the solution nearly to the boiling-point, and acidify with half an ounce of the hypophosphorous acid; then stir in the ferrous, sodium, and magnesium sulphates, whereby double decomposition almost immediately ensues. After stirring two or three minutes, throw the whole on a paper filter, and wash the precipitate with water to 70 ounces. Dissolve the remainder of the hypophosphite of calcium (3 ounces 368 grains) in 25 ounces of water; filter, mix the filtrate, add the remaining 5 ounces of hypophosphorous acid, and make up with water to 100 ounces.† During a few days after its preparation it deposits a minute quantity of calcium sulphate, from which, however, it may wholly be freed by decantation or filtration. The solution is clear and permanent; it may be mixed with simple syrup, claret, and glycerin in any proportion, but the salts are gradually deposited from mixtures containing an appreciable percentage of alcohol.—Pharm. Jour. Trans., January, 21st, 1880, pp. 603–694.

Effervescent Solutions of Hypophosphites.—Mr. R. W. Gardner prepares solutions of purified salts of the hypophosphites in distilled water, charges them with carbonic acid gas, and bottles them in siphons. Very acceptable and stable solutions are thus obtained, which are particularly useful in cases where there is objection to sugar.—Drug. Circ., August, 1881, p. 115.

Liquor Aluminii Acetici—Preparation.—Th. Poleck, to whom was referred the subject of liquor aluminii acetici, about to be introduced into the new German Pharmacopœia, has prepared it by the different formulas that are in use in various German hospitals, etc., and has found them all to produce unstable preparations. His experiments have led him to recommend the following formula, which produces a stable preparation containing from 7.5 to 8 per cent. of acetate of aluminium, and which is equally suitable for internal and external uses. He adopts as a basis the sulphate of aluminium of commerce, containing 95 per cent. of the sulphate. 300 parts of sulphate of aluminium are dissolved in 800 parts of water, and 360 parts of diluted acetic acid are added. 130 parts of carbonate of calcium are then mixed with 200 parts of water, and the mixture is gradually added to the solution. The whole is allowed to stand, with occasional stirring, for twenty-four hours. The precipitate is strained off, and the liquid filtered. In the experiment, the filtrate amounted to 1277 parts, and had a specific gravity 1.0457. It is clear, colorless, and has a faint odor of acetic acid. When treated with 2 per cent. of sulphate of potassium and heated on a water-bath it gelatinizes, but after cooling again, becomes clear and liquid. While the preparation is probably best preserved in the cellar, this appears not to be absolutely necessary, since it has kept well in the laboratory and other rooms.—Arch. d. Pharm., April, 1882, pp. 257–268.

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* Avoirdupois weight.

† Probably imperial measure ?—REP.

Referring to Mr. Poleck's formula, Dr. Vulpius, who has operated with it, finds it to be in every respect satisfactory. The operator may at first be discouraged at the apparently large quantity of precipitate of sulphate of calcium; but during the exposure this shrinks very much, and, if the final pressing is done under a press, becomes a very small volume.—Ibid., 248–270.

Liquor Aluminii Acet. containing Glycerin is recommended by J. Muller to be made as follows: 100 parts of aluminate of soda are triturated with 500 parts of water at 40° to 50° and the magma is gradually added to a mixture of 400 parts of diluted acetic acid and 50 parts of glycerin, the mixture being stirred frequently. When solution is completed, the liquid is allowed to settle, decanted and filtered. It contains, in round numbers, 3 per cent. of alumina, corresponding to 10 per cent. of two-thirds basic acetate of alumina. In the course of time only a small deposit of basic acetate of alumina separates, but it is best prepared in quantities which insure its early consumption.—Pharm. Ztg., No. 78, 1881, p. 589.

Solution of Camphorated Chloride of Calcium—Preparation and Antiseptic Value.—Mr. Carlo Pavesi describes the properties, the mode of preparation, as well as the various applications of a compound which he has obtained by mixing chloride of calcium with camphor in certain proportions and under particular conditions, and which he considers to possess valuable properties. This compound, which he has called "camphorated chloride of calcium," is obtained as follows: 5 parts of powdered camphor are dissolved in 25 parts of alcohol in a glass flask, and a solution of 50 parts of chloride of calcium in 150 parts of common water is added to it. The ingredients must be thoroughly mixed, by allowing the mixture to stand several days, during which time it must be frequently and well shaken. It is then filtered through paper, a little diluted alcohol being poured upon any residue on the filter so as to dissolve as much as possible out of the mixture. So prepared a limpid liquid is formed, which will not bear dilution with water without throwing down camphor. It coagulates milk, egg, and blood albumen, and preserves the coagulums from change; preserves meat, is said to act as an antiseptic when applied to wounds, and seems also to be serviceable as a hæmostatic. The author, indeed, considers it applicable in all cases where the Listerian mode of treatment is adopted, and that it ought eventually to replace carbolic acid for the purpose. —Phar. Jour. Trans., April 22, 1882, p. 864.

Liquor Sodii Carbolatis—Formula of the Dutch Society for the Advancement of Pharmacy.—Carbolic acid, 5 parts; solution of soda (specific gravity 1.330), 1 part; distilled water, 4 parts. Mix them. A clear liquid, of an alkaline reaction, a specific gravity of 1.060 to 1.065, and miscible with water and alcohol in all proportions. It should be freshly prepared when wanted for use.—New Rem., May, 1882, p. 14.

Antiseptic Liquid—Preparation from certain Lavas.—According to Dr. Horteloup an antiseptic liquid is obtained in France by treating certain lavas with hydrochloric acid, whereby the silicates are decomposed. After standing, a thick, greenish, granular mass separates from a yellowish syrupy liquid, the latter containing aluminium chloride 61.75, potassium chloride 19.81, chloride of iron 15.09, calcium chloride 2.13, gelatinous silica 1.22 (the amount of water is not given). Diluted with 100 parts of water it has been applied with lint, and diluted with 1000 parts of water it has been used as a wash. It does not affect the unbroken skin, is free from odor, and is sold at the moderate price of 5 francs per liter.—Am. Jour. Phar., February, 1882, p. 63, from Rep de Phar., December, 1881, p. 562.

Aqua Traumatica Sendneri—A Disinfecting Liquid.—This is prepared as follows: Cinchonine sulphate 1.0, alum 2.0, are powdered and dissolved in distilled water 200.0; to this is added tincture of opium 5.0, and tincture of benzoin 20.0. The milk-like mixture is either injected into suppurating wounds, or it is applied upon linen or lint; it is a disinfectant, soothes pain, and promotes healing. Quinidine sulphate may be substituted for the cheaper cinchonine salt.—Amer. Jour. Phar., June, 1882, p. 308, from Phar. Centralhalle, 1882, p. 133.

Piazza's Caustic Fluid—Composition and Use.—The composition of this caustic fluid is as follows: ℞. Ferri chloridi, ʒviss; sodii chloridi, ʒiiiss; aquæ destill., ℥j.—M. A single drop of this is injected by M. de Saint Germain into nævi, and repeated at intervals of eight days.

Each injection produces a small scar, and the operation is only complete when the whole surface of the nævus has been transformed into a scar.—Amer. Jour. Phar., August, 1881. p. 423, from Med. and Surg. Rep. July, 1881.

Tectrion.—Under this name a solution of magnesium chloride is recommended for use as a non-freezing liquid. It is, however, not adapted for gas-meters, since it corrodes iron. It has also been used for increasing the weight of dyed yarns. In 1865 magnesium chloride was recommended by Dr. A. Frank in the preparation of fire-brick for puddling furnaces.—Amer. Jour. Phar., March, 1882, p. 116, from Zeitsch. Oest. Ap. Ver., 1881, p. 446.

MELLITA.

Mel Rosæ—New Process of Preparation.—E. Langlet recommends the following process: 100 grams of bruised red rose leaves are macerated for three hours with a mixture of water 160, alcohol 20, and ether 20 grams. The liquid is expressed, and preserved in a cool place. An infusion is now made of the rose leaves with 600 grams of boiling water, strained, clarified with white of egg, evaporated at a low temperature to 150 grams, and mixed with 600 grams of good and thick honey. The mixture is heated to the boiling-point, the ethereal liquid is added in small portions, and the heat continued, without boiling, until the ether has been expelled; the honey is cooled, and filtered through paper.—Am. Jour. Pharm., February, 1882, p. 64; from Rép. de Phar., 1881, p. 405.

Mel Rosæ—New Formula.—The following formula is given in "Phar. Zeitschr. f. Russl." (May or June, 1882): Macerate 300 grams of red rose leaves, 160 grams of water, 20 grams of alcohol, and 20 grams of ether, for three hours; express the liquid, and macerate the residual rose leaves again for three hours in 600 grams of boiling water. This liquid is expressed, clarified with albumen, evaporated to 150 grams, and mixed with 600 grams of pure white honey. The mixture is then heated, and the ethereal alcoholic liquid added gradually so that the ether may evaporate. The whole is now to be filtered through a coarse paper filter if necessary.—Chem. Journ., June 16th, 1882, p. 370.

Mel Rosæ—Improved Formula.—Mr. Silvio Plevani suggests the following improvement on the formula of mel rosæ: Beat together by gradual additions in a marble mortar with a wooden pestle, 125 grams of petals of fresh roses and 50 grams of white sugar; add 350 grams of white honey, 100 grams of water, and 50 grams of distilled rose water. Mix, heat in a sand-bath, and afterwards express. Let it stand and deposit, and decant. This yields a preparation of a fine rose color, with an astringent and acid taste, and a marked odor.

Kept in a well-stoppered bottle, it may be preserved in good condition for a year.—Chem. and Drug., June, 1882, p. 249; from Jour. de Phar. et de Chim., June, 1882.

MISTURÆ.

Emulsions—Proportions of Oil, Water, and Gum.—Professor J. U. Lloyd communicates a paper on emulsions, in which he gives careful directions as to the proper manipulation and precautions to be observed. He recommends the following proportions to secure uniform success: 1 part of oil; ½ part of powdered acacia; 1 part of water in portions of ½ part at each addition. The oil and gum arabic are first triturated together; then one-half of the water is added, and then the remaining one-half of the water. When a smooth emulsion has resulted, any other ingredients may be added, observing that alcoholic liquids are added last.—The Druggist, August, 1881, p. 174.

Emulsions—Preparation.—C. Lewis Diehl draws attention to the following rules, which he considers indispensable to the uniformly successful and rapid production of emulsions of fixed or volatile oils:

1. That the water and gum arabic shall be in definite and absolute proportion to each other. This proportion is three (3) parts of water to two (2) parts of gum, both by weight.
2. That the relation of oil to gum (and water) shall be definite within certain limits; that is to say, the mucilage formed in the above proportions is capable of perfectly emulsifying a minimum and a maximum proportion of oil. The minimum proportion is two (2) parts of oil to one (1) part of gum; the maximum proportion is four (4) parts of oil to one (1) part of gum.
3. That the trituration of the oil, gum, and water be continued till a perfectly homogeneous, milky-white, thick creamy mixture is formed —*i. e.*, until perfect emulsification takes place—before the addition of a further quantity of water or other liquid.

The thick creamy emulsion obtained, if the above conditions are fulfilled, must be the basis of all perfect emulsions. It will bear dilution to any extent with water, forming mixtures varying, according to the proportion added, from the appearance and consistence of cream to that of very thin milk. Obviously the water may be replaced by solutions of saline compounds, syrups, etc., and this enables the production of the various combinations of cod-liver oil in current use from the above thick creamy emulsion, which, for distinction, he designates as:

I. *Concentrated Emulsion of Cod-liver Oil.*—Take of fresh Norwegian cod-liver oil, eight (8) troy ounces; powdered gum arabic, two (2) troy ounces; distilled water, three (3) troy ounces. First weigh the gum into a Wedgwood or porcelain mortar, then the oil, and triturate till the gum is well mixed with the oil; then weigh into the mixture the distilled water, and triturate the whole briskly until the mixture thickens and acquires a pasty consistence and milky whiteness. Now scrape down the portions adhering to the sides of the mortar and to the pestle, and continue the trituration for a short time, after which add such other ingredients as may be desirable, or transfer the concentrated emulsion to a wide-mouthed bottle for future use.

II. *Simple Emulsion of Cod-liver Oil.*—Take of concentrated emulsion of cod-liver oil, thirteen (13) troy ounces; oil of wintergreen, twenty-four (24) drops; syrup, one (1) fluid ounce; water, three (3) fluid ounces. Weigh the concentrated emulsion into a mortar, add the oil of wintergreen, and triturate thoroughly; then gradually add first the water and then the syrup.

III. *Emulsion of Cod-liver Oil with Hypophosphite of Lime.*—This differs from the simple emulsion in that 128 grains of hypophosphite of calcium are dissolved in the water.

IV. *Emulsion of Cod-liver Oil with Hypophosphite of Lime and Soda.*—This differs from the simple emulsion in that 128 grains of hypophosphite of calcium and 96 grains of hypophosphite of sodium are dissolved in the water.

V. *Emulsion of Cod-liver Oil with Hypophosphites.*—This differs from the simple emulsion in that 128 grains of hypophosphite of calcium, 96 grains of hypophosphite of sodium, and 64 grains of hypophosphite of potassium are dissolved in the water.

VI. *Emulsion of Cod-liver Oil with Phosphate of Lime.*—This differs from the simple emulsion in that 256 grains of phosphate of calcium are dissolved in the water by the aid of 128 grains of hydrochloric acid.

VII. *Emulsion of Cod-liver Oil with Phosphate of Lime and Soda.*—This differs from the simple emulsion in that 256 grains of phosphate of calcium and 64 grains of phosphate of sodium are dissolved in the water, acidulated with 128 grains of hydrochloric acid.

VIII. *Emulsion of Cod-liver Oil with Lactophosphate of Lime.*—This differs from the simple emulsion in that 256 grains of lactate of calcium dissolved in 2 fluid ounces of diluted phosphoric acid are substituted for 2 fluid ounces of the water.

IX. *Emulsion of Cod-liver Oil with Wild-cherry Bark.*—This differs from the simple emulsion in that the oil of wintergreen is substituted by 8 drops of oil of bitter almonds, and in that 1 fluid ounce of the fluid extract of wild-cherry bark is substituted for 1 fluid ounce of the water.

X. *Emulsion of Castor Oil.*—Take of castor oil, four (4) troy ounces; powdered gum arabic, one (1) troy ounce; distilled water, one and one-half (1½) troy ounces; syrup, cinnamon-water, of each three (3) fluid ounces; spirit of cinnamon, twelve (12) minims. Emulsify the oil with the gum and distilled water as directed under I, then add the other ingredients successively with constant trituration. This emulsion contains 33 per cent. of castor oil, and is consequently more limpid than the 50 per cent. cod-liver oil emulsions above described, and is in every respect an elegant preparation.—Louisville Med. News, February 18th, 1882, pp. 75–77.

Emulsions—Preparation by the Agency of Irish Moss.—Dr. A. B. Huested gives the details of some experiments made with a view to determining the value of Irish moss as an emulsifying agent. He finds that while by the aid of Irish moss a presentable emulsion can be obtained, the objection to its use is the apparent inability to minutely divide the oil-globules, and the labor attending its use, especially when an emulsion is to be made quickly. With gum arabic as an emulsifying agent a much finer division of the oil can be very readily effected, even with no special effort. On the other hand emulsions made with Irish moss will keep comparatively well. The author has prepared mucilages with various proportions of the moss, and finds the following to be the best: Take two drachms of dry Irish moss; wash thoroughly in two or three portions of water; transfer to a suitable dish, and add 2 pints of water; apply heat, gradually increasing until the boiling-point is reached; continue till the moss is nearly all dissolved and the whole amount reduced to nearly one-half. While still hot pour upon a funnel-shaped wet flannel filter and allow the mucilage to drain off, not using pressure or stirring, as it will force through small particles of the moss and make it cloudy and dirty. Three fluid ounces of glycerin are finally added to thirteen fluid ounces of mucilage so obtained. This mucilage, if filled in bottles, heated to boiling, and then sealed, appears to keep well for use as required (see Proceedings, 1881, p. 80).

The method found best for making emulsions is by agitation in a bottle, holding about one-third or one-half more than the amount desired to be made. Introduce first the mucilage, add the oil in five or six portions, shaking thoroughly between each, and until it shows a white creamy layer, with no streaks or granular appearance when thrown against the inside of the bottle and allowed to run down. Neither trituration in a mortar, nor what is called churning, has been successful in the author's hands. Emulsions containing 50, 66, and 75 per cent. of codliver oil can be prepared with it, but a 50 per cent. emulsion, being thinner, is perhaps the most suitable. The following formula for

Emulsion of Cod Liver Oil with Hypophosphites is given: Mucilage, prepared as above, f℥xxx; cod liver oil, Oj; hypophosphite of calcium, grs. 512; hypophosphite of sodium, grs. 256; chloride of sodium, ʒj; oil of bitter-almond, gtt. xl; oil of wintergreen, gtt. xvi; oil of cassia, gtt. viij; water, f℥ij. Make the emulsion; then rub the salts with the essential oils, then with the water, mixing well together, and add to the emulsion, shaking thoroughly. An

Emulsion of Castor Oil may be prepared by the following formula: Mucilage, prepared as above, f℥xviij; castor oil, f℥xxiv; citric acid, ʒi; white sugar, ℥xij; oil of bitter-almond, gtt. xxx; oil of wintergreen, gtt. xij; oil of cassia, gtt. vj. Rub the acid and sugar to a very fine powder, add the oils, then mix with the emulsion prepared as before.—New Rem., July, 1881, pp. 194–195; from Proc. N. S. State Phar. Assoc., 1881.

Emulsion of Cod-Liver Oil—New Process.—Mr. Charles T. George recommends the following formula: Irish moss, 1 ounce; water, 1 pint; boil for 15 or 20 minutes, stirring constantly, and strain when cold. Gradually add, with constant stirring and beating, a mixture of cod liver oil 2½ pints, oil of bitter almonds 2 scruples, and oil of wintergreen 6 drachms; when perfectly emulsified, add 12 fluid ounces of glycerin and sufficient water to make the whole measure 5 pints. Salts soluble in water may be added, or other essential oils may be used. Mr. George gives also the following formula for

Emulsion of Castor Oil.—Castor oil, 1 pint; oil of wintergreen, 2 drachms; glyconin, 4 fluid ounces; glycerin, 6½ fluid ounces; cinnamon-water sufficient for 2 pints. Add the oils gradually to the glyconin, stirring constantly; when perfectly emulsified, add the glycerin and water.—Am. Jour. Pharm., July, 1881, p. 380, from Proc. Pa. Pharm. Assoc.

Emulsion of Cod Liver Oil with Hypophosphites of Calcium, Sodium, and Potassium—Preparation.—Mr. E. V. Zoeller communicates the following formula and process for an emulsion containing 50 per cent. (by volume) of cod liver oil, and 5 grains of mixed hypophosphite in each half fluid ounce. It has ordinary consistence, but separates on standing in two layers, which mix readily when agitated. Rub 1 ounce of calcium hypophosphite, and 2 drachms 40 grains each of potassium and sodium hypophosphite with 6 ounces of water. Make 1½ pints of decoction from 1 ounce of clean, light-colored Irish moss, first thoroughly washing it, by boiling with 3 pints of water for about an hour, then straining through muslin without pressure. Add to this decoction ½ pint of glycerin, allow to cool to about 125° F., but do not let the mixture solidify. Then add 2½ pints of cod liver oil in portions of 4 fluid ounces at a time, and emulsify by vigorous agitation. To the emulsion add the hypophosphites and water, in successive portions, agitating thoroughly. Lastly, add a solution of 1 drachm each of oil of bitter almonds, oil of cassia, and oil of sassafras, and 1½ drachms of oil of gaultheria, in 2 fluid ounces of alcohol.—Proc. N. C. Pharm. Assoc., 1881, p. 48.

Emulsion of Cod Liver Oil—Preparation with Decoction of Laminaria Saccharina.—Mr. James Wheeler gives the following process: Put into a bottle of suitable size, 10 parts of cod liver oil, 1 part of glycerin, and 9 parts of cold decoction of Laminaria saccharina (see Infusa et Decocta), and mix by agitation. A small quantity of essential oil may be added to flavor. Mr. Wheeler prefers oil of eucalyptus. The emulsion has been subjected to some crucial tests, and is found to keep well; the flavor also seems to be agreeable to those who have taken it as prepared by Mr. Wheeler.—Pharm. Jour. Trans., February 4, 1882, p. 644.

Emulsions—Use of Quillain (so called) in their Preparation.—Mr. S. A. McDonnell, in a paper read before the California College of Pharmacy (January 12, 1882), describes the use of "quillain" for emulsions; the name "quillain" being suggested for the dry aqueous extract of quillaia bark, as short and expressive. The yield of the brownish-colored extract, made by boiling, is from 20 to 25 per cent.; its taste is sweetish, with an acrid aftertaste, and it is easily pulverizable and not hygroscopic; it may also be obtained in transparent scales by drying it on plates of glass, and though it may be obtained colorless by treatment with animal charcoal, this is not deemed necessary, since the brown extract will yield a very white emulsion. It dissolves quickly in water, and such a solution, agitated with twice its bulk of any fixed oil, very readily yields a perfectly homogeneous emulsion, which on standing for two or three days may show a partial separation of turbid watery liquid, this being intimately united again with the emulsified oil by gentle agitation. A non-separating, but much thicker, emulsion may be made by using quillain gr. ix, water ℥i, and oil ℥ix. Emulsions containing quillain, but no sugar, have been kept on hand for a year without spoiling. The author gives the following practical formulas: ℞. Quillaini, gr. ii; aquæ, ℥ii; olei ricini, ℥ii. Misce. ℞. Quillaini, gr. iii; aq. cinnamomi, ℥iiss; olei ricini, ℥iii; glycerini (vel syrupi), ℥ss. ℞. Quillaini, gr. iv; aquæ, ℥i; olei morrhuæ, ℥iv; syr. hypophosphit., ℥iii; olei aurantii, gtt. v. Misce. ℞. Quillaini, gr. i; aquæ gaultheriæ, ʒvii; oleoresinæ filicis, ʒi Misce. The ingredients are designated in the order in which they should be mixed. (See also a paper by H. Collier in Proceedings, 1880, p. 60.)—Am. Jour. Pharm., April, 1882, 179.

Emulsion of Cod Liver Oil with Hypophosphites.—F. Grazer proposes to prepare this with a tincture of quillaia made by digesting 4 ounces of the bark with 24 ounces of water and 8 ounces of alcohol. Two ounces of the tincture are heated to evaporate the alcohol, mixed with

2 ounces of glycerin and the necessary quantity of hypophosphites, when the mixture is beaten into a creamy state by means of an egg beater. Twelve ounces of cod liver oil are next added in small quantities, being properly emulsified after each addition, and flavored with essential oil of almonds. The odor and taste of the oil are thus completely disguised. The emulsion is thick, requiring a wide-mouth bottle, is permanent, a slight separation which may take place being easily remedied by a little agitation, and mixes in all proportions with water without separating any oil-globules; it is easily made, palatable, and contains 75 per cent. of cod liver oil.—Am. Jour. Pharm., April, 1882, p. 179, from Proc. Calif. Coll. Phar., 1882, p. 31, 32.

Emulsion of Castor Oil—Administration.—M. Persehne recommends an emulsion prepared from 15 grams of castor oil with one yolk and 45 grams water, which after the addition of about 10 grams of brandy or sherry wine, is taken in lemonade.—Am. Jour. Pharm., September, 1881, p. 456, from Phar. Zeitsch. f. Russl., 1881, p. 398.

Castor Oil Emulsion.—In a private letter Mr. Charles A. Heinitsh informs the Reporter that in the formula for this emulsion in last year's Proceedings (p. 83) "glyconin" should be substituted for glycerin, the latter being a printer's error in the "Transactions of the Penna. Phar. Association," and thence copied into the other journals. Mr. Heinitsh observes, however, that if a portion of the "syrup" is substituted by an equal quantity of "glycerin," the emulsion becomes more permanent.

Emulsion of Oleoresin of Male Fern.—Mayet recommends the following formula: Water, 24 drops; oleoresin of male fern, 4.0 grams; powdered gum arabic, 1.2 grams. Make the emulsion and add sufficient water. Limousin effects the emulsion simply by the use of yolk of egg.—Am. Jour. Pharm., September, 1881, p. 456, from Bull. et Mem. Soc. de Thérap., 1881.

Cod Liver Oil Jelly—Preparation.—Robert F. Fairthorne gives the following formula for a cod-liver oil jelly, the consistence of which is such that it may be taken in water, milk, or wine, without tasting the oil: 5 fluid ounces of cod-liver oil, 2 drachms of the best isinglass, and 1 fluid ounce of water, are placed in a suitable vessel over a water-bath, and sufficient heat is applied to melt the isinglass; 1½ ounces of white powdered sugar, with which 4 drops each of oil of bitter almonds and oil of allspice, and 2 drops of oil of cinnamon (Ceylon) have been incorporated, are now added, the vessel is removed from the fire and the mixture is stirred until it thickens. A firm jelly results, which keeps well when put up in corked bottles.—Amer. Jour. Pharm., September, 1881, p. 452.

Cod-Liver Oil and Iron—Improved Process.—Mr. L. Draisma Van Valkenburg communicates a process, devised by Professor Van der Burg, which is intended as an improvement on the one previously (see Proceedings, 1881, p. 85) recommended by him. It is as follows: Cod-liver oil, 100 parts; soda-lye (specific gravity, 1.18), 3.5 parts; iron protosulphate (precipitated from alcohol and in 10 per cent. solution), 20 parts. The soda-lye is mixed with the oil, the mixture is heated upon a water-bath, and the solution of ferrous sulphate is added. A rapid current of air is then immediately passed through the mixture, observing that a temperature of 85°–90° C. shall be maintained until the combination is effected. This operation is accompanied by considerable frothing, and the vessel must, therefore, be only partly filled. The time required depends upon the manner in which the air is introduced, as well as the quantities that may be operated upon. During this process the ferrous oxide, at first produced, is gradually converted into ferric oxide, and this combines, at the moment of its formation, with the fatty acids of the oil. The finished preparation contains about 0.25 per cent. of iron, and after subsidence becomes perfectly clear and of a dark garnet-red color.—Pharm. Ztg., November 16, 1881, p. 688; from Nieuv. Tidscr. voor de Pharm. in Nederland, October, p. 289.

Antiseptic Mixture.—A. Pennès recommends the following: Dissolve, by agitation, purified salicylic acid, 50 grams; santonin and quinine sulphate, of each, 20 grams, in 450 grams of 90 per cent. alcohol; then add tincture of Cape aloes (1:5) 10 grams, and rectified eucalyptol 50 grams; agitate occasionally during 12 hours and filter. This mixture is very bitter and active, but not dangerous, and may be given in doses of 5 to 30 drops, mixed with milk, Spanish wine, or gum syrup, or may be injected subcutaneously, or mixed with bran or starch as clysters.—Amer. Jour. Pharm., February, 1882, p. 63; from Bull. Gén. de Thérap., October 30, p. 360.

Mistura Apii Composita—Dr. W. A. Hammond's Formula.—The following formula is given by Professor Maisch: Fluid extract of coca, 2 ounces; fluid extract of viburnum, 1 ounce; fluid extract of apium graveolens, 1 ounce. M. This forms an excellent nerve sedative and tonic, the dose of which is one or two teaspoonfuls three times a day. —Drug. Circ., April, 1882, p. 51.

Lactucarium Mixture.—When lactucarium is prescribed in the form of an emulsion the trituration with water in successive portions is very tedious. Mr. Adolf G. Vogeler finds that the process is very much facilitated if a few drops of spirit of nitrous ether are sprinkled over the lactucarium before adding the water. It is then readily divided in the liquid.—The Pharmacist, July, 1881, p. 245.

Lac Ferratum (Iron Milk)—Aqua Phosphatis Ferrici Albi (Milk of White Phosphate of Iron—Formula of the Dutch Society for the Advancement of Pharmacy.—Sodium phosphate, 27; solution of chloride of iron (specific gravity, 1.480), 17; distilled water, 1000. Dissolve the sodium phosphate in the distilled water and gradually pour in the solution of chloride of iron [previously diluted with 3 or 4 volumes of distilled water]. Stir well, collect the precipitate upon a linen strainer, wash it with distilled water until the washings are scarcely rendered turbid by solution of nitrate of silver, and mix the still moist precipitate with sufficient distilled water to produce a volume of 1000 parts [that is, the above quantities, in grams, are to yield 1 liter of the milk]. It contains 0.25 per cent. of iron (see also Proceedings, 1877, p. 93).

Lac Iodatum (*Iodine Milk*), of the same society, is prepared as follows: Cow's milk, 30; tincture of iodine (1 in 13), 1. Warm the milk to 30° C. (86° F.), and add to it, under stirring, the tincture of iodine. This preparation should only be made when wanted for use.—New Rem., March, 1882, p. 74.

Lac Ossium.—This is a preparation obtained by saturating somewhat diluted hydrochloric acid by digestion with bones burned to whiteness, cooling, filtering, and evaporating the liquid until it has the specific gravity 1.200. Of this liquid 500 grams are diluted with 6000 grams of distilled water, poured into a cold solution of 330 grams of pure sodium carbonate in 6000 grams of distilled water, and the precipitate is washed by decantation until the washings cease to react with nitrate of silver. The yield is 3000 grams. It is important that the precipitation be effected in the cold and from a strongly diluted solution.—Amer. Jour. Pharm., March, 1882, p. 116; from Pharm. Ztg., No. 89, 1881; Pharm. Weekbl.

Albumen Water.—This is recommended as a good substitute for milk and beef-tea in cases where these disagree with the patient, or could not be obtained. The preparation is largely used by the French, and is made by dissolving the white of one or more eggs in a pint or two of water, sweetening with glycerin and flavoring with orange-flower water. It is an excellent food in typhoid fever and typhoid dysentery.—Chem. and Drug., July, 1881, p. 291.

PILULÆ.

Pill Masses—Glucose (?) as an Excipient.—Mr. Peter W. Lascheid has experimented with glycerite of starch, glycerite of tragacanth, and with glucose,* with a view to determining their comparative value as excipients, and as a result gives preference to glucose as being more nearly a universal excipient than either of the others. Very good results were obtained, among others with such substances as mixtures of aloes and dried ferrous sulphate, quinine sulphate and sodium salicylate, calomel and prepared chalk, tannin and opium, lead acetate and opium, etc., and in all these cases the pills made with glucose were readily dissolved or completely disintegrated.—Am. Jour. Phar., July, 1881, pp. 326–328.

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* By glucose the author evidently means the commercial, thick, honey-like substance so called.—REP.

Pills—Manna as an Excipient.—Mr. Robert F. Fairthorne recommends manna as an excipient for making pills from certain substances that are with difficulty made into pills that will retain the spherical form. Amongst others may be named reduced iron, subnitrate and subcarbonate of bismuth, oxalate of cerium, calomel, bicarbonate of sodium, tannin, extract of logwood, Dover's powder, acetate of lead, sulphate of zinc, chlorate of potassium, phosphate of iron, ammonio-ferric alum, lactate of iron, citrate of iron and ammonium, aloes, and sulphite of sodium. After these have been made up into pills with any of the ordinary excipients of a soluble character, they almost always flatten, and often unite together in a mass that is both unsightly and the cause of much inconvenience. This difficulty can be overcome by using manna and syrup in variable proportions, according to the substance operated on. The quantity of manna required is from 25 to 33 per cent. of weight of the article to be made into pills. The manna is best placed in the mortar first, softened with a few drops of syrup, and the medicinal ingredients added to it.—Amer. Jour. Phar., June, 1882, p. 311.

Aloes Pills—Audhoul's Formula.—Dr. V. Audhoul thinks the composition of most aloetic pills is faulty. They often contain too much aloes, and often substances still more irritating are combined with it. He recommends the following as being free from these objections: R. Cape aloes, 30 grains; cream of tartar, 30 grains; almond oil soap, 60 grains; gum arabic, 30 grains; simple syrup, 5 drops. Make into one hundred pills. Dose: one, two, or more, according to circumstances. He considers Cape aloes the best stomachic laxative.—Drug. Circ., November, 1881, p. 165.

Pills of Carbonate of Iron—Manipulation.—Mr. Hans M. Wilder advises the following manipulation in making these pills by the method of Professor J. M. Maisch: Rub two drachms each of protosulphate of iron and carbonate of potassium together until the mixture acquires a pasty consistence. Add half a drachm of powdered tragacanth, mix, and let stand ten to fifteen minutes. Then make a mass by the addition of five or six drops of simple syrup.—Am. Jour. Phar., December, 1881, p. 603.

Pills of Iodide of Lithium.—Professor Zeisst, of Vienna, recommends these pills, prepared as follows: R. Lithii iodidi, 1.50; pulv. et extr. quassiæ, 9.50; ut fiant pilulæ, No. xx; S. One pill morning and night. (See Iodide of Lithium, under "Inorganic Chemistry.")—Amer. Jour. Phar., June, 1882, p. 308; from Phar. Centralh., 1882, p. 134.

PULVERES.

Dover's Powder—Strength according to Different Pharmacopœias.—Mr. Peter Squire, at one of the meetings of the recent International Congress, called attention to the dangerous difference between the formulas of the Belgian and French Pharmacopœias, and those of all others. The British, Austrian, Danish, German, Greek, Hungarian, Norwegian, Portuguese, Russian, Swedish, Swiss, Dutch, and United States Pharmacopœias, uniformly direct 1 part of powdered opium in 10 parts of the powder; the Spanish order 1 part in twelve; but the Belgian and French Pharmacopœias direct 1 part of *extract* of opium in eleven, or nearly twice the strength of all the others. Now the Commission of Revision of the French Codex have decided to conform to common usage, and recommend the adoption of the original formula, as given by Swediaur in the "Universal Pharmacopœia" of 1803. This is as follows: Nitrate of potassium, sulphate of potassium, of each 4 ounces; ipecac, opium, of each 1 ounce (all in powder). Mix intimately.—Drug. Circ., November, 1881, p. 165.

Improved Dover's Powder.—Dr. H. D. Vosbough, after trying various compounds, has used the following with results entirely satisfactory: Opii pulv., ipecacuanha pulv., āā ʒi; potass. nitr. pulv., ʒiv; pulv. camphoræ (prepared as below), rad. glycyrrhizæ pulv., āā ʒij. M. In order to keep the camphor in a perfect powder he grinds it with an equal bulk of English creta preparata, and this is dispensed in the above as "pulv. camphoræ." Dr. Vosbough observes, that this powder seems to him to be a better anodyne, a better sudorific, and a better hypnotic than any other compound he has ever seen called Dover's powder.—Am. Jour. Pharm., August, 1881, p. 423; from N. Y. Medical Record.

Pulvis Glycyrrhizæ Aromaticus—A New Vehicle for Quinia.—Mr. Hans M. Wilder suggests a powder under this name, which, in his experience, admirably disguises the taste of quinia, when mixed with about ⅓ to ½ its bulk, or about ¼ its weight of the latter. It is prepared by thoroughly mixing 2 drachms of aromatic powder, 6 drachms of powdered extract of licorice, and 15 grains of carbonate of ammonium. He states that children will take such a mixture readily.—Am. Jour. Pharm., December, 1881, p. 603.

Effervescent Powder of Rochelle and Epsom Salts.—Mr. Robert F. Fairthorne communicates the following formula, which furnishes a pleasant effervescent powder devoid of the bitterness of the Epsom salt it contains. A condition to its permanency is that the powders used should be dried perfectly at a temperature between 90° and 120° F., for if not perfectly free from moisture, the mixture sooner or later becomes a solid mass. The substances are separately powdered and passed through a No. 40 sieve. They are the following: Rochelle salt, 5 pounds, 10 ounces; bicarb. soda, 2 pounds, 14 ounces; tartaric acid, 2 pounds, 8½ ounces; sulphate of magnesia, 1 pound, 9 ounces (all Avoirdupois weight). Mix intimately.—Am. Jour. Pharm., September, 1881, p. 452.

Effervescent Citrate of Iron—Formula.—The following is given by Mr. Kossmann Gollantsch in the "Pharm. Zeitg.:" Ferri et ammon. cit., 4; acid. citric., 37.5; sugar, 37.5; bicarb. soda, 45. Make into a granulated powder by the aid of absolute alcohol. If carefully prepared this preparation is of a citron-yellow tint, keeps well, and effervesces freely.—Chem. and Drug., September, 1881, p. 397.

Saccharated Iron—Preparation.—J. Förster, after alluding to the defects in the formulæ as yet proposed or in vogue for preparing saccharated iron, proposes the following as being the simplest and cheapest: 1 kilogram of solution of iron perchloride, of 15 per cent., is mixed in a spacious porcelain or stoneware vessel with ½ kilogram of sugar previously dissolved in water, to which mixture 1 kilogram 200 g. of soda crystals, dissolved in double that quantity of water, are then added. The hydrated iron oxide thereby formed dissolves again upon stirring so long as an excess of iron chloride is present, until upon the addition of the remainder of the soda solution the mixture consolidates to a thick pulp. The whole is freed as completely as possible from carbonic acid by stirring, and ½ kilogram of caustic soda lye of a specific gravity of 1.33 added. After stirring for some time, a clear reddish-brown liquid is formed; this is made up to 10 kilograms by adding distilled water, and the saccharated iron precipitated by passing a lively stream of carbonic acid through the mixture.

The best kind of developer for the carbonic acid the author finds to consist of a wide-mouthed bottle with a long safety funnel and wash-bottle, the materials for producing the gas being magnesite, pieces of marble or chalk, and common hydrochloric acid. The precipitation is best carried out in a tall cylinder, the end of the developing-tube being bound round with a piece of calico so as to cause the gas to rise in small bubbles.

The precipitation is complete in five or ten minutes, whereupon the mixture is diluted to 15 kilograms, and the whole placed upon a sackfilter covered with wet calico. After draining a night, the precipitate is twice stirred up with 15 kilograms of distilled water, and when this has drained off, the precipitate is mixed with 1 kilogram 200 g. of powdered sugar, and the whole evaporated down in a porcelain or tin vessel under frequent stirring. When the mixture has attained the consistency of syrup, the sugar dissolves the iron again; the mixture is then completely dried, either over a steam-bath or in thin layers on glass plates in a drying-box. Thus dried, saccharated iron is an inelegant brown powder, and is spread out in thin layers on paper and exposed for some days to the action of the air, whereby its color changes into a uniform light brown. The mass is then again dried, and according to the percentage of iron required in the preparation is mixed with more or less sugar.

The saccharated iron thus prepared has a clean, sweet taste, and mixed with water yields a light reddish-brown neutral solution.—New Rem., September, 1881, p. 285; from Arch. d. Pharm. and Chem. and Drug.

On the basis of the above process, and of observations that have since been made, Dr. C. Brunnengräber has recommended the following formula, which has been adopted for the new German Pharmacopœia:

Ferrum Oxidatum Saccharatum Solubile (Eisenzucker, Iron Sugar).—Nine (9) parts of powdered sugar are dissolved in nine (9) parts of water, thirty (30) parts of solution of ferric chloride (sp. gr. 1.280–1.282, containing 10 per cent. of iron) are added, and then gradually with stirring a solution (prepared warm and allowed to cool) of twenty-four (24) parts of carbonate of sodium in forty-eight (48) parts of water. After the carbonic acid has escaped as much as possible, twenty-four (24) parts of solution of soda (sp. gr. 1.159–1.163, containing 15 per cent. NaOH) are gradually added, and the mixture is allowed to stand until it has become clear. After adding nine (9) parts of bicarbonate of sodium, the mixture is diluted with six hundred (600) parts of boiling water and set aside to settle. The supernatant liquid is drawn off with a siphon, and the precipitate is mixed with four hundred (400) parts of hot water. When it has settled the clear liquid is removed, and the precipitate is treated once more with four hundred (400) parts of hot water in the same way. It is then collected on a wetted cloth, washed with hot water until the washings, diluted with 5 volumes of water, only become opalescent with nitrate of silver, and is then pressed. The pressed precipitate is transferred to a porcelain capsule, mixed with fifty (50) parts of powdered sugar, evaporated under stirring in a steam-bath, powdered, and the powder mixed with sufficient powdered sugar to make the whole weight one hundred (100) parts. A red-brown, sweet powder, having a ferruginous taste, containing 3 parts of iron in 100 parts, and forming with 20 parts of hot water a perfectly clear, red-brown, scarcely alkaline, solution.—Arch. d. Pharm., April, 1882, p. 289–291.

Sucrocarbonate of Iron.—Dr. Dauvergne regarding this preparation as being not a true chemical compound on account of its being decomposed by water, and claiming for himself the combination, in 1842, of sugar with carbonate of iron; Dr. Dujardin-Beaumetz refers to the numerous chemical compounds which are decomposed by water, and briefly reviews the history of saccharated carbonate of iron, which was proposed by Dr. Becker, of Mulhausen, and prepared in 1837 by C. Klauer, pharmacist, of the same place, in the proportion of 2 parts of sugar to 1 part of the carbonate. In 1838 Vallet, guided by these observations, invented his pills. In 1841 Klauer's preparation was adopted by the Pharmacopœia of Baden. In the British Pharmacopœia it contains 40 per cent., and in the German Pharmacopœia 20 per cent. of carbonate, the latter amount corresponding nearly to that found in the crystals (18.44 per cent.). The author strongly recommends the adoption by the Pharmacopœia of the powder as the most agreeable and most convenient pharmaceutical form of ferrous carbonate.—Am. Jour. Pharm., February, 1882, p. 62; from Bull. Gén. de Thérap., October 15, p. 316, 317; see also Proceedings, 1881, p. 309.

Saccharated Iodide of Iron.—This, according to A. Jandous, may be rapidly prepared by dissolving iron with iodine in the presence of 50 per cent. alcohol; no secondary products are formed, and the final exsiccation is accomplished in so short a time that the preparation may be almost made extemporaneously.—Am. Jour. Pharm., March, 1882, p. 116; from Phar. Post, No. 24, 1881.

Powdery Form of Copaiva.—P. Carles has succeeded in obtaining copaiva in powdery form as follows: 150 grams of resin of copaiva and 200 grams of copaiva are melted together at a gentle heat, 100 grams of calcined magnesia are added, and the whole is well worked until a homogeneous mass is formed. This becomes hard, and may then be powdered. The powder affords a convenient means of administration to children, in cases of croup, diphtheritis, etc.; being mixed with honey, milk, etc., and readily taken when it is rejected in its usual form.—Arch. d. Pharm., September, 1881, p. 230; from Jour. de Pharm. et de Chim. (5), iv, p. 45.

Almond Meal—Formula.—The following formula is recommended for this useful cosmetic: Almond meal, in fine powder, prepared from blanched bitter almonds, after the oil has been extracted, 6 ounces; orris root, in fine powder, 4 ounces; wheat flour, 4 ounces; white Castile soap, in fine powder, 1 ounce; borax, in fine powder, 1 ounce;

oil of bitter almonds, 10 drops; oil of bergamot, 2 drachms; tincture of musk, 1 drachm. Mix thoroughly, and pass the mixture through a fine sieve.—New Rem., March, 1882, p. 95; from Month. Mag. of Pharm.

Infant Powder.—Dr. Klamann recommends as preferable to lycopodium, starch, etc., the following mixture for dusting in intertrigo, eczema, and erythema of infants: Calcined magnesia, 5.0; talc, 25.0; salicylic acid, 0.2; oleo-balsamic mixture, gtt. x. The powder is a very effectual remedy and entirely harmless.—Am. Jour. Pharm., February, 1882, p. 65; from Phar. Centralhalle, December 15th; from Deut. Med. Zeitg., 1881, No. 48.

Phosphorescent Powders—Preparation.—These compounds, which have been recently employed in Europe for rendering signs, dials, etc., visible at night, are prepared by Pfeiffer, Fitz, Corty, and Talleyrand Périgoid, by mixing 100 grams of calcium carbonate and phosphate, prepared by calcining oyster shells or cuttlefish bones, with 100 grams caustic lime, 25 grams calcined table salt, and adding to this mixture from 20 to 25 per cent. of sulphur, and 3 to 7 per cent. of sulphide of calcium, barium, strontium, or magnesium, previously exposed to the sunlight. A phosphorescent material prepared by incinerating marine algæ is also added for the purpose of increasing the illuminating power. The powders are rendered adhesive by means of varnish, collodion, paraffin, isinglass, etc., or may be incorporated in melted glass. —Am. Jour. Pharm., February, 1882, p. 65; from Jour. de Phar. et de Chim., October, 1881, p. 352; Jour. Phar. d'Als. Lorr.

Anti-asthmatic Powder.—A celebrated London anti-asthmatic powder is composed of 1 part each of nitrate of potassa and anise, and 2 parts of stramonium leaves. A thimbleful of this powder, placed on a plate, is pinched into a conical shape and lighted at the top. It is then held near the patient, who inhales the fumes.—Am. Jour. Pharm., August, 1881, p. 422; from Med. and Surg. Rep., July, 1881.

SAPONES.

Soap-making.—A very complete and interesting article on the art of soap-making is given in "The Pharmacist," May and June, 1882, pp. 177–186 and 212–215. The paper is profusely illustrated.

Medicated Soaps—Formulas of the Dutch Society for the Advancement of Pharmacy.—The following are given in "New Rem.," May, 1882, pp. 145–146.

Sapo Guaiacinus (Guaiac Soap).—Guaiac, 2 parts; potassa, 1 part; water, q. s. Rub them together and add enough water, in drops, to produce a mass of a pilular consistence. It should not be kept in stock.

Sapo Picis Liquidæ (Tar Soap).—Medicinal soap (Castile soap), 24 parts; carbonate of sodium, dried and powdered, 2 parts; borate of sodium, powdered, 1 part; tar, 8 parts; water, q. s. Mix them together to a mass of a pilular consistence and divide it into pieces of suitable size.

Sapo Terebinthinæ Liquidus (Liquid Turpentine Soap, Balsamum Vitæ Citrinum).—Carbonate of sodium, 3 parts; medicinal (Castile) soap, 4 parts; oil of turpentine, 6 parts; compound spirit of mastic, 6 parts; compound spirit of juniper, 6 parts; water, 60 parts. Heat the carbonate of sodium, soap, oil of turpentine, and water for several hours on the water-bath, filter and add the spirits.

The compound spirits of mastic and of juniper are the preparations of the Dutch Pharmacopœia. The first is obtained by distilling 1 part each of mastic, olibanum, myrrh, and amber, with 10 parts of stronger alcohol and 12 parts of water, until the distillate has the specific gravity of 0.873 to 0.878; the second, by distilling together 3 parts of juniper berries, 1 part each of caraway and fennel, 14 parts stronger alcohol, and 30 parts of water, until the distillate has the specific gravity of 0.929 to 0.935.

Sapo Stibiatus (Antimony Soap).—Sulphide of antimony (Schlippe's salt), 1 part; medicinal (Castile) soap, 3 parts; water, 3 parts. Dissolve the sulphide of antimony in the water, add the soap, and reduce the mass to a pilular consistence by a gentle heat.

Whenever the mass assumes a red color, on the water-bath, add a little solution of soda.

The soap should have an ash-gray color, and be soluble in water. It should be kept in a well-stoppered bottle.

N. B. Schlippe's salt is prepared as follows: 75 parts of carbonate of sodium (cryst.) are dissolved in 300 parts of water, heated to boiling, and mixed with a milk of 26 parts of lime and 100 parts of water. After half an hour's boiling, 9 parts of sublimed sulphur and 36 parts of levigated sulphide of antimony are added, and the whole boiled until the gray color has disappeared, when the liquid is filtered and crystallized. The salt has the composition: $Na_6Sb_2S_8.18H_2O$. It is a sulphantimonate of sodium.

Medicated Soaps.—The following formulas are published in "Phar. Centralhalle," December 15th; from "Seifenfabrikant," 1881, No. 23:

Tannin Soap.—Cocoanut oil 9 kilos is saponified with soda lye 4.5 kilos; 250 grams tannin dissolved in alcohol are then added, and finally, the perfume, consisting of Peru balsam, 30 grams, oil of cassia and oil of cloves, of each 10 grams.

Iodine Soap.—Cocoanut oil, 10 kilos; lye of 38° B., 5 kilos; and potassium iodide, 500 grams, dissolved in 250 grams water.

Gall Soap.—1.5 kilo of gall is mixed with 25 kilos of cocoanut oil, and the latter saponified in the cold with 12.5 kilos soda lye of 38° B. The soap is colored with 350 grams ultramarine green, and perfumed with 75 grams each of oil of lavender and caraway.

Camphorated Sulphur Soap.—Cocoanut oil, 12 kilos; soda lye of 38° B., 6 kilos; sulphuretted potash, 1 kilo, dissolved in water 0.5 kilo; camphor, 160 grams, to be dissolved in the melted cocoanut oil.—Am. Jour. Pharm., February, 1882, p. 64.

Petroleum Soap—Preparation.—L. Bastil, a French chemist, has obtained a patent for a petroleum soap in which equal proportions of animal or vegetable fats are used with petroleum. The fatty matter is melted and a small quantity of boracic acid is fused into it. A similar quantity of boracic acid is in like manner added to the mineral oil at the temperature of 90° Fahrenheit. The chemist also dissolves a similar quantity, ½ per cent., of boracic acid in his alkaline solution. The partially acidified animal or vegetable fat and the mineral oil are mixed by gradually pouring the melted animal or vegetable fat into the mineral oil and constantly stirring or agitating. He then gradually adds the alkali containing the boracic acid, while still maintaining the agitation. The saponification is completed by further addition of as much ordinary alkaline solution as may be required, and finishing off pretty nearly in the usual manner.—New Rem., October, 1881, p. 304.

Eau de Cologne Soap.—The following receipt, taken from a German soapmaker's journal, is given in "New Remedies" (October, 1881, p. 304): White Castile soap, 2000 parts; oil of lemon, 8 parts; oil of neroli, 4 parts; oil of sweet orange, 6 parts; oil of rosemary, 1 part; oil of thyme, 1 part; oil of petit grain, 2 parts; essence of civet (30 grams of civet to 1 liter of alcohol), 4 parts.

SPIRITUS.

Spiritus Aetheris Nitrosi—Assay.—Professor J. F. Eykman rejects all methods that have hitherto been proposed for the estimation of nitrous ether in the spirit as unreliable, and proposes one which agrees in general with the methods of Schloessing, Schulze, Wulfers, Richardt, Tiemann, and others, for the assay of nitric acid in well-water, etc. It depends on the determination of the volume of nitric oxide gas (NO), which is produced by decomposing ethyl nitrite by a ferrous salt, and is driven over and collected by distillation in an atmosphere free of oxygen. For the details of the process and a description of the apparatus see "New Rem.," May, 1882, pp. 139–142.

Spiritus Ætheris Nitrosi—Ethereal Strength.—Mr. Henry L. Warne has examined ten commercial samples of spirit of nitrous ether and determined the nitrous ether by Feldhaus's method (see "Proceedings," 1878, p. 478). They all effervesced with bicarbonate of potassium, and with the exception of three samples were all changed to brownish-yellow by the action of solution of potassa during 24 hours. Two of the exceptions were changed to yellow and the other to light-yellow. They were all deficient in ether, the highest percentage being 1.60 per cent., while the lowest contained only 0.141 per cent.—Am. Jour. Phar., December, 1881, pp. 605–606.

Among other formulas for spirits the Dutch Society for the Advancement of Pharmacy has adopted the following, which differ to some extent from similar formulas hitherto proposed:

Spiritus Cochleariæ Compositus (Sydenham's Antiscorbutic Beer).—Cochlearia, fresh flowering herb, 72 parts; curled mint, dried and cut, sage, dried and cut, of each, 6 parts; orange-peel, dried and cut, 8 parts; nutmeg, bruised, 1 part; stronger alcohol, 36 parts; water, 360 parts. Macerate during one day and distil until the distillate has a specific gravity of 0.960 to 0.980.

Spiritus Melissæ Compositus.—Melissa, dried and cut, 8 parts; lemon-peel, fresh cut, bruised nutmeg, bruised coriander, of each, 2 parts; bruised cloves, bruised cinnamon, of each, 1 part; alcohol, 55 parts; water, 70 parts. Macerate during one day and distil off 72 parts. The specific gravity of the distillate should be 0.906.

Spiritus Valerianæ Compositus.—Bruised valerian, 9 parts; bruised lovage seed, 3 parts; pennyroyal, cut, 2 parts; savin, cut, 1 part; alcohol, water, of each, 35 parts. Macerate during one day and distil off 30 parts.

Spiritus Vulnerarius Ricordi (Ricord's Wound-Spirit).—Common thyme (*Thymus vulgaris*), origanum, melissa, peppermint, marjoram, rosemary, sage, wild thyme (*Thymus Serpyllum*), hyssop, wormwood, rue, tansy (in seed), Roman chamomile, lavender, of each, 1 part, alcohol, 48 parts. Macerate during one day and distil until the distillate has a specific gravity of 0.873.—New Rem., June, 1882, pp. 170–171.

Compound Spirit of Juniper, Phar. Neerl., and

Compound Spirit of Mastic, Phar. Neerl.—Formulas.—See *Sapo Terebinthinæ liquidus*, under "Sapones," page 107.

Bay Rum—Preparation at St. Thomas.—Mr. A. H. Riise gives an account of the preparation of bay rum. He states that many varieties of the bayberry tree exist throughout the West Indies, which are scarcely to be distinguished botanically, but have quite a different odor from that which the genuine tree,

Pimenta acris, W. A., or *Myrcia acris. D. C.*, has. Great care must be therefore taken in the collection of the leaves which are to be used in the distilling of bay spirit, as the admixture of a small quantity of the other leaves may entirely spoil the product of distillation. The fresh leaves are mixed, in the still, with the ripe berries in a certain proportion, the ethereal oil of the latter having a much stronger aroma than that of the leaves, and the product is thereby improved, though becoming more expensive on account of the high price of the berries. The rum used for the distillation is selected with great care. It must be of the very best quality and free from foreign odor. A good St. Croix rum, which must be considerably stronger than that generally brought into the market, serves the purpose best. The distillation must be conducted with great care, and is best done in copper stills by the use of steam. Nevertheless, nearly all the commercial distilled bay rum is prepared over the open fire, to the great detriment of the flavor.—Amer. Jour. Phar., June, 1882, pp. 278–280.

Cologne Water.—Mr. Thomas J. Covell communicates to "New Rem." (February, 1882, p. 42) the following formula for cologne water: Oil of lavender flowers, ʒ4; oil of rosemary, ʒ2; oil of neroli, bigarade, ʒ10; oil of petit grain, ʒ10; oil of lemon, ʒ10; oil of orange, ʒ20; oil of bergamot, ʒ20; oil of rose geranium, ʒ4; tincture of storax, ʒ16; cologne spirit, O26; orange-flower water, O6. Mix. Use troy weight for the oils. See Proceedings, 1881, p. 408.

Antiseptic Cologne—Preparation.—Mr. Robert F. Fairthorne, having frequently noticed that the odor of carbolic acid is either covered or removed by admixture with chloral, applies this observation in the preparation of an antiseptic cologne as follows: Cologne, 8 fluid ounces; chloral hydrate, 2 drs.; quinine (alkaloid), 10 grs.; pure carbolic acid, 30 grs; oil of lavender, 20 drops. Cologne so prepared is by no means disagreeable.—Amer. Jour. Phar., February, 1882, p. 67.

Fruit Essences for summer drinks may be prepared as follows from either raspberries or strawberries: Fresh fruit, 50 lbs.; alcohol, 52 liters. Let stand for 24 hours. Add 23 liters of water, and distil over 50 liters.—Chem. Jour., June 2d, 1882, p. 341; from Phar. Zeitschr. Russ., May, 1882.

SUCCI.

Fruit Juices—Preparation and Preservation.—Mr. James W. Parkinson, in "Confectioner's Journal" gives the following method for preparing fruit juices. Juicy fruits, such as strawberries, raspberries, cherries, and currants, are mashed in a basin to a pulp. Place on the fire and make scalding hot. Now pour into a hair sieve and allow the juice to strain through. Put into bottles and securely tie down. Place these bottles in a caldron of cold water, heat and boil for twenty minutes. Remove from the fire and allow to remain in the caldron until cold. Then set away for use.

In the case of non-juicy fruits, such as apples, pears, peaches, etc., put the fruit into a basin. Cover with water and boil to a pulp. Now place on a hair sieve and allow to drain without any pressing. Observe now that it is only the liquor which passes through the sieve without pressing which is to be used for flavoring purposes. What remains in the form of pulp is not adapted for these uses. Now put the juice obtained as above into bottles, and proceed to treat as already laid down for the juicy fruits.—New. Rem., October, 1881, p. 304.

Juices, etc.—Preservation.—Mr. Champion, of Beauvais, has constructed an apparatus for the preservation of fermentable substances, which are first heated by means of a water-bath to between 60° and 80° C. for the purpose of destroying the ferment present, and by atmospheric pressure are then forced into a bottle from which the air has been previously removed by means of an air-pump, after which the bottle is stoppered. The apparatus is easily operated and occupies little space. The juices of asparagus, mulberries, quinces, etc., as well as syrups, have been perfectly preserved in this manner for more than a year.—Am. Jour. Phar., July, 1881, p. 360, from Bull. Soc. Phar., Bordeaux, 1881, p. 24–27.

Red Bilberry Juice.—C. Mylius found 2.07 per cent. of acid (calculated as malic acid) in the juice of the berries of Vaccinium Vitis Idæa. The juice also contains 4.1 per cent. of sugar (calculated as levulose), which is not very much changed by fermentation; in an experiment made only 0.65 per cent. of alcohol, corresponding to 1.3 per cent. of sugar, was found. The author draws attention to these characters with a view to establishing characters whereby its purity may be distinguished. A case has come under his notice in which it had been adulterated with

Cherry Juice.—The color does not give any points of distinction, but the acidity of the cherry juice is much less than that of the bilberry juice. The presence of cherry juice was readily evidenced by the blue color, due to hydrocyanic acid (which see under "Inorganic Chemistry," Rep.), produced when the juice was distilled to one-half, and the distillate treated with sulphate of copper and tincture of guaiac. This blue color, though faint, was quite distinct. Mr. Mylius believes that the same test is available for the detection of cherry juice in other fruit juices.—Arch. d. Pharm., November, 1881, p. 360, from Phar. Centralb., 1881, No. 39.

SUPPOSITORIA.

Suppositories—Preparation.—Dr. T. J. Reed recommends the following process of preparation: Weigh out the ingredients and the cacao butter, and place them on an ointment slab which has had some boiling water poured over it. If there is an extract, as belladonna, etc., a few drops of water must be used to thin it. Then rub up with a spatula, just like an ointment. By this means, equable and smooth diffusion of the ingredients may be secured and seen, the heated slab melting the cacao butter. The mould, which may be of the simplest description, should be placed on ice. The spatula can now be used as a spoon to lift the semifluid mass and pour it into the mould, rubbing up again the remainder as each cavity is filled. If the quantity has been adjusted to fit the mould, elegance with correctness will result.—Drug. Circ., September, 1881, p. 129.

Suppository Mass.—Mr. J. Muller having been in the habit of making suppositories by triturating the cacao butter thoroughly with a little castor oil, in the cold, and then adding the remedial agent prescribed, has found it convenient to keep a ready-made mass, prepared by melting together 6 parts of cacao butter and 1 part of castor oil. This mass can be kneaded to a homogeneous mass in the mortar with comparative ease, and may be readily mixed with any substance whatever. The suppositories are best formed by the aid of the pill-tile and a little lycopodium, or starch.—New Rem., March, 1882, p. 87, from Phar. Ztg., 1881, No. 97.

Nutrient Suppositories—Preparation.—The following is communicated by Mr. H. E. Spencer to the "Practitioner:"

Artificially-digested meat is mixed with a little wax and starch, and made into a suppository. These suppositories are of such a size that the digested and extracted product of twenty ounces of meat from which the insoluble matter is removed is contained in about five suppositories. The convenience of this method is very great. It is easy for most patients to introduce them themselves, and their use is attended with no discomfort whatever in the majority of cases. After an hour or two the waxy basis is frequently returned, the peptone and extractive being absorbed. In some few cases, owing to irritability of the rectum, the whole suppository has returned; but this can be obviated by the addition of a little opium to each suppository.—Am. Jour. Pharm., June, 1882, p. 307, from Am. Pract., April, 1882, p. 227.

Iodoform Bougies with Glycerin.—The hospital at Heidelberg, Germany, requires bougies containing at least 90 per cent. of iodoform, but no gelatin. These are prepared according to K. Mueller, in the following manner: 92.5 parts of iodoform triturated with alcohol are rubbed up, in a warm mortar, with a solution of 5 parts of gum arabic, 2.5 parts of glycerin, and 2.5 parts of water, until a plastic mass results. This is formed into bougies which are rolled out between two boards; each bougie is ten centimeters long and contains about 3.5 grams. If the mass is too friable, a little water may be added. The bougies are afterwards placed in a warm situation for a couple of hours, when they will be ready for use. They contain now: iodoform, 92.5; glycerin, 2.5; gum arabic, 5 parts. To avoid their flattening, during the drying, by their own weight, they should be supported along both sides by a small roll of wax paper.

Iodoform Bougies with Gelatin.—Dr. Vulpius directs these to be made as follows: Dissolve 15 parts of the finest gelatin in 50 parts of water; add 7.5 parts of glycerin on a water-bath, evaporate the solution to 54 parts, and mix it intimately, by stirring, with 27 parts of iodoform triturated with alcohol. Then pour the mixture into a moderately warm mould, which is to be immediately placed in ice-water to produce a rapid congelation, and thereby prevent the settling of the heavy iodoform. The cylinders are then dried in a warm atmosphere, until they have lost one-third of their weight.—New. Rem., June, 1882, p. 162.

Iodoform Pencils—Preparation.—These are prepared by K. Mueller by triturating 92.5 grams finely-powdered iodoform with a solution of 5 grams gum arabic in 2.5 grams each of glycerin and water until a plastic mass is obtained, which is rolled out to the desired thickness, and cut into pieces of about 10 centimeters (4 inches). Should the mass become too brittle a few drops of water are added. The pencils become dry in about two hours, and to prevent flattening are laid upon wax paper, creased so as to form a gutter.—Am. Jour. Phar., June, 1882, p. 308, from Phar. Ztg., 1882, No. 13, p. 92.

SYRUPS.

Syrups—White Wine as a means of Insuring their Preservation.—Professor Prota Giurleo asserts that all the methods that have been proposed for the preservation of certain medicinal syrups are fraught with a certain amount of inconvenience, and he has endeavored to find some better means of rendering them quite unalterable, so that the physician may be perfectly certain that the product he employs is always pure, always the same, and quite devoid of the liability to decompose. With this view he divides pharmaceutical syrups in three classes:

1. Those syrups which contain a well-defined chemical principle, such as a base, an acid, or a salt.
2. Syrups which contain a balsam, a resin, or some analogous principle.

3. Syrups containing a principle which must be extracted by boiling or by some simpler method, such as extracts of roots, bulbs, rhizomes, barks, flowers, leaves, fruit, etc.

Those of the first and second classes can be preserved for a long time without any decomposition whatever by the methods now in use. It is, therefore, on the third class that the author's researches bear more particularly. The spoiling of the syrups of this class is due to various causes; among others, to the presence of casein, albumen, fibrin, gum, gluten, starch, sorbin, mannite, etc., which, he admits, give rise to different kinds of decomposition in contact with sugar and water. The various experiments which Professor Giurleo has made with antiseptics, such as sulphites, hyposulphites, boracic acid, borate of sodium, chloral, salicylic acid, and a few others, have not given him results as satisfactory as he could have desired. But, on the other hand, wine vinegar has yielded in his hands most satisfactory results. As next to this he finds white wine an excellent preservative, and, on account of certain drawbacks to the use of wine-vinegar, he proposes the use of white wine. Syrup of poppies, of squills, of polygala, etc., have kept perfectly for upwards of twenty months, notwithstanding their exposure to air, sunlight, and dust. The process is carried out as follows:

The medicinal substance is inclosed in a stout bottle, pure white wine is added to it, and the bottle is placed in a water-bath, where it is heated to from 40° to 80° C. The mixture is cooled, pressed, filtered, mixed with sugar 1000 parts, water 300 parts, so as to make 1500 parts of syrup.—Drug. Circ., January, 1881, pp. 3–4, from the "Monthly Magazine of Pharmacy."

Simple Syrup—Precautions in Preparation.—This syrup, if prepared from refined sugar with distilled water or with water free from lime, according to Lacombe, does not need clarification with albumen to become clear; while on the other hand ordinary water containing lime yields a turbid syrup, requiring clarification.—Amer. Jour. Phar., May, 1882, p. 243, from "L'Union Phar."

Syrups for Soda Water—Orange and Lemon.—Mr. R. F. Fairthorne states that very superior syrups can be made in the following manner: Take the peels of six oranges or lemons; cut them very thin; make a tincture of them by macerating in 6 fluidounces of alcohol for three days. Having filtered it, pour it on 1 pound (avoirdupois weight) of sugar contained in an evaporating-dish or other suitable vessel, and allow the alcohol to evaporate spontaneously. When dry dissolve in ½ pint of water in which, if orange syrup is to be made, 1½ ounce of citric acid, if lemon, 2 ounces of the acid and 2 drachms, are to be dissolved. This mixture, added to 11 pints of simple syrup, will produce fine-flavored syrups, which keep well.—Amer. Jour. Phar., November, 1881, p. 567.

Syrupus Aurantii Corticis Recentis.—Mr. Charles T. George prepares this syrup as follows: Macerate for eight days, 12 ounces of freshly grated orange-peel in alcohol 20 ounces and water 5 pints; filter and dissolve without heat 10 pounds of white granular sugar.

Syr. Limonis Cortic. Rec. may be made in the same manner.—Amer. Jour. Phar., July, 1881, p. 380, from "Proc. Pa. Phar. Assoc."

Syrup of Wild-cherry—Modified Process.—Mr. J. B. Moore recommends the following formula, based upon the officinal process, which, he states, furnished a darker syrup, having the sensible properties of the bark much more intensified than the officinal preparation. 5 troy ounces of the bark, in No. 60 powder, are moistened with 5 fluid ounces of a mixture of 6 fluid ounces of glycerin and 17 fluid ounces of water at 110°. The moistened bark is packed firmly in a salt-mouth bottle or other air-tight vessel, and set aside in a moderately warm place for forty-eight hours. It is then packed into a glass percolator, and the remainder of the menstruum gradually poured on, followed by water until 19 fluid ounces of percolate are obtained. In this 12 troy ounces of sugar are dissolved by agitation, 5 fluid ounces of glycerin are added, and the syrup is strained if necessary.—Drug. Circ., December, 1881, p. 177.

Syrup of Senega—Improved Formula.—Prof. E. L. Patch recommends the following formula, which yields a clear and permanent syrup of senega: Senega, No. 30 powder, 250 parts; percolate with a menstruum consisting of dilute alcohol, 1900 parts, and aqua ammoniæ (960 specific gravity), 15 parts. Filter the percolate through absorbent cotton; evaporate to 480 parts; add glycerin, 150 parts, and sugar, 720 parts, and dissolve cold. Prof. Patch also recommends the following improved formula for

Arom. Syrup of Rhubarb, whereby a more sightly preparation is obtained than by the officinal formula: Rhubarb, 20 parts; cinnamon, cloves, of each 4 parts; nutmeg, 2 parts. Reduce to powder No. 40, moisten and percolate with a menstruum composed of 40 parts of glycerin, 70 parts of alcohol, and 120 parts of water. Continue percolation with water until 420 parts of percolate are obtained, in which dissolve 610 parts of sugar without heat.—New Rem., January, 1882, p. 23.

Compound Syrup of Sarsaparilla—Preparation without the Use of Alcohol by Intermittent Displacement.—Mr. Robert F. Fairthorne has prepared a compound syrup of sarsaparilla, which is equally strong in taste as that prepared by the officinal process, by the use of water instead of diluted alcohol for displacement. He effects this by "intermittent displacement," by which is meant a process of alternate maceration and displacement as described in the following: The solid ingredients required by the Pharmacopœia for one gallon of syrup (with the exception of the sugar), are reduced to a moderately fine powder, and placed loosely into a percolator closed by a cork. Cold water sufficient to saturate the ingredients is then poured on and the whole allowed to stand 24 hours, after which the drugs are firmly packed, the cork is removed, and water added so as to produce one pint of percolate; after 24 hours another pint, and after another 24 hours a third pint of percolate is obtained in the same manner, and the three pints of percolate are set aside in a cool place. Percolation is continued until a half-gallon more of percolate is obtained, which is concentrated to one pint, on a water-bath, and used with the three reserved pints of liquid to make the syrup in the well-known manner. —Amer. Jour. Pharm., December, 1881, pp. 625, 627.

Syrup of Lactucarium—New Process of Preparation.—Mr. F. Hohenthal alludes to some of the difficulties accompanying the published processes for its preparation, and recommends the following: Macerate 1 ounce of lactucarium with 3 or 4 ounces of benzin for 24 hours; decant the benzin solution, dry the residue, mix it with an equal bulk of clean, dry sand, and exhaust with diluted alcohol so as to make 8 fluid ounces of tincture. Evaporate this to 6 fluid ounces, add 2 fluid ounces of water, and dissolve in this liquid 12 ounces of sugar, bringing the measure to 1 pint by the addition of more water, or, if preferred, glycerin.—Drug. Circ, November, 1881, p. 163.

Syrup of Peptone—Formula.—A. Petit gives the following formula for a syrup of peptone (see "Albuminoids"): Peptone, 5 parts; tincture of orange-peel, 5 parts; sugar, 60 parts; water, 30 parts.—New Rem., March, 1882, p. 77; from Rep. de Pharm., 1881, p. 213.

Syrup of Chloral.—The difficulty of covering the peculiar acrid taste of chloral is overcome to a considerable extent in the following formula, given by Mr. R. F. Fairthorne: R. Chloral hydr. crys., 80 grains; aq. menth. pip., f℥iij; Curaçoa cordial, f℥iv; syrup. acacia, q. s., ut ft. f℥ij.—Amer. Jour. Pharm., September, 1881, p. 454.

Syrup of Hydriodic Acid—Stability, etc.—Mr. W. Gilmore draws attention to the superior stability of a syrup of hydriodic acid over the aqueous solution of the same, a fact that was already noted by Mr. Murdoch, of Glasgow, when, 30 years ago, he first introduced hydriodic acid. Mr. Murdoch originally prepared a syrup containing 2 grains of hydriodic acid in the teaspoonful, while Dr. Buchanan proposes 5 grains to the teaspoonful. Mr. Gilmore's experiments lead him to prefer the weaker preparation as more stable. The hydriodic acid for this purpose is best made direct from iodine by the action of sulphuretted hydrogen. To facilitate the reaction of the iodine, which soon becomes coated with sulphur, it is triturated from time to time with the acid liquid, so that the sulphuretted hydrogen may act upon the iodine in solution.—Chem. and Drug., February, 1882, pp. 65, 66.

Mr. Edward R. Godding has also made experiments to determine the stability of hydriodic acid when mixed with sugar or syrup. He finds that a mixture of 80 minims of diluted acid, made from iodine by the process formerly officinal in the U. S. Pharm., with 1 fluid ounce of water and 1½ troy ounces of rock candy, then filtered and exposed to direct sunlight for seven days, has since remained unchanged. A syrup of the same acid, obtained by dissolving 1½ troy ounces of rock candy in 1 ounce of the acid, became red upon standing; but it became clear (colorless? Rep.) on the addition of 3 drops of solution of hyposulphite of sodium (1 : 8) to a fluid ounce. Syrups of hydriodic acid made in the same way as the latter, but with a dilute acid obtained by the action of tartaric acid upon solution of iodide of potassium, had a yellow color, but did not change further. The addition of 5 drops of hyposulphite of sodium solution produced permanent milky turbidity in this.—New Rem., April, 1882, p. 100.

Syrup of Iodide of Iron—Estimation of Strength.—W. A. H. Naylor and David Hooper communicate a simple method for the estimation of iodide of iron, in the hope that pharmacists may be induced not to neglect the examination of the syrup of this salt. The methods hitherto in use require the observance of special precautions and the consumption of much time. That of the author's closely approximates to the most reliable gravimetric methods, and admits of easy and rapid execution. It is based upon the fact that certain iodine compounds form double salts with mercuric chloride, which remain in solution until an excess of the latter reagent is added, when mercuric iodide becomes precipitated; a reaction which has already been made use of by Personne for the volumetric estimation of iodide of potassium. Like the latter they employ a semi-decinormal test solution of mercuric chloride, each 10 c.c. of which contains 0.1355 of the salt, and will be equivalent to 0.254 gram of iodine, since two molecules of the latter require one molecule of mercuric chloride. The mode of working is very simple, and consists in dropping from a burette the volumetric solution into a measured quantity of syrup in a flask, diluted with about ten times its quantity of water. A rotary motion must be communicated to the flask after each addition of the mercuric chloride; the end of the reaction will be indicated by the appearance of a feeble precipitate, which remains permanent and imparts a scarlet color to the liquid. The paper is accompanied by tables showing the close correspondence of the results by the new method with those of the best gravimetric method, and the percentages of iodide of iron in commercial samples of syrup of iodide of iron, all of which were found to be below the standard of the British Pharmacopœia.—Yearbook of Phar., 1881, p. 409–413.

Syrup of Iodide of Iron—Preparation.—Mr. J. A. Sheets recommends that the following points be observed if a permanent and uniform syrup of iodide of iron is aimed at: First. The iodine to be as free of moisture as possible. Second. Use the best iron wire, and have it thoroughly clean. Third. The water should be of reasonable purity. Fourth. Use only the purest granulated sugar (crushed sugar cannot be examined so well). Fifth. Make the solution of the ferrous iodide without heat. Sixth. Have the syrup cold when it is mixed with the solution.—Proc. N. C. Phar. Assoc., 1881, p. 44–46.

Syrup of Protochloride of Iron—New Process of Preparation.—Mr. Alfred Früh, taking advantage of the fact of sugar reducing ferric to ferrous chloride in the rays of the sun, has prepared a syrup of protochloride of iron successfully, as follows: Take of solution of perchloride of iron (U. S. P.), 5 fluid drachms and 20 minims; glycerin, 4 ounces (fl.? Rep.); simple syrup, sufficient to make 1 pint; oil of rose, oil of neroli, of each 1 drop. Mix and expose to the direct rays of the sun until entirely colorless. Three or four days will be sufficient in summer, while in very cold weather six to eight days will be required for the reduction, which can be promoted by heating the syrup near the stove before exposing it to the sun.—Am. Jour. Phar., March, 1882, p. 129.

Syrup of the Hypophosphites of Calcium, Sodium, and Potassium with Iron—Preparation.—Mr. E. V. Zoeller communicates the following formula: Calcium hypophosphite, 5 drachms 20 grains; potassium hypophosphite, sodium hypophosphite, ferrous lactate, of each 2 drachms 40 grains; citric acid, 2 drachms; extract of vanilla (1 ounce to Oj), 2 drachms; water, 5 ounces; syrup, sufficient to make 20 ounces. Dissolve the hypophosphites in the water with the aid of the citric acid. Dissolve the iron lactate in the syrup, add the extract of vanilla, mix the solution with the syrup, and filter through a well-wetted filter.

Glycerole of the Hypophosphites may be made like the above, substituting glycerin for the syrup.—Proc. N. C. Phar. Assoc., 1881, p. 47.

Syrup of Hypophosphites with Iron—Improved.—See under "Elixirs."

The following formulas for syrups have, among others, been adopted by the Dutch Society for the Advancement of Pharmacy. Most of them differ either in strength, or in some other respects from the corresponding formulas hitherto published, and may, therefore, properly find place here:

Syrupus Ætheris.—Ether, stronger, 1 part; alcohol, stronger, 1 part; syrup, 15 parts. Mix the ether with the alcohol, then add the syrup, and mix by agitation.

Syrupus Ferri Bromidi.—Iron, in powder, 1 part; bromine, 2 parts; sugar, 15 parts; distilled water, q. s. Put the iron into a flask, pour upon it 10 parts of distilled water, and add the bromine in small quantities at a time, and under constant agitation. Filter the light-green liquid into a flask containing the sugar, and wash the filter with sufficient distilled water to make the contents of the flask weigh 27 parts. Finally, dissolve the sugar by agitation, and preserve it in small well-closed vials.

Syrupus Depurativus (Larrey)—*Larrey's Purifying Syrup.*—Sarsaparilla, cut and bruised, 200 parts; guaiac wood, rasped, 50 parts; china root (Smilax China), in coarse powder, 5 parts; sassafras, rasped, 5 parts; seneca, 6 parts; borage (Borago officinalis), 6 parts; elder juice (inspissated), 40 parts; molasses, 500 parts; sugar, 500 parts; water, q. s. Boil the sarsaparilla, guaiac wood, and china root for half an hour with enough water so that 720 parts of liquid may be separated from the dregs. Add to this liquid the sassafras, seneca, and borage; let it macerate for half an hour, and strain. Then mix the strained liquid, which should amount to 700 parts, with the other ingredients.

Syrupus Eucalypti.—Eucalyptus leaves, 5 parts; sugar, water, of each, q. s. Pour 50 parts of boiling water upon the eucalyptus, let it macerate for one hour, then strain and express. For every 12 parts of liquid so obtained, add 20 parts of sugar, and dissolve.

Syrupus Fuci Vesiculosi.—Extract of seawrack (see "Extracta"), 1 part; water, 1 part; syrup, 7 parts. Dissolve the extract in the water and add the syrup.

Syrupus Ipecacuanhæ Stibiatus (Antimonial Syrup of Ipecac.).—Tartrate of antimony and potassium, 3 parts; tincture of ipecac. (1 : 10), 100 parts; syrup, 2000 parts; water q. s. Dissolve the tartrate of antimony and potassium in a little water; add the solution to the tincture and syrup contained in an evaporating-dish, and evaporate, on a water-bath, until the product weighs 2000 parts.

Syrupus Juglandis (Syrup of Butternut Leaves).—Extract of butternut leaves, 1 part; syrup, 60 parts. Dissolve the extract in the syrup.

Syrupus Juglandis Compositus (Compound Syrup of Butternut Leaves).—*Vanier's Antirachitic Syrup.*—Extract of butternut leaves, 4 parts; extract of brown (gray) cinchona, 2 parts; alcohol, 4 parts; port wine, 6 parts; syrup, 180 parts; iodide of potassium 1 part; oil-sugar of anise (1 part of oil and 50 parts of sugar), 3 parts. Mix the extracts with the alcohol, port wine, and 10 parts of syrup. Dissolve the iodide of potassium and the oil-sugar of anise in 170 parts of syrup and mix the two liquids.

Syrupus Juglandis Compositus cum Oleo Morrhuæ (Compound Syrup of Butternut Leaves with Cod-liver Oil).—Compound syrup of butternut leaves, 19 parts; cod-liver oil, 1 part. Mix them.

Syrupus Lactucarii (Syrup of Lactucarium).—Lactucarium, 1 part; sugar, q. s.; water, q. s. Rub the lactucarium with a little sugar and 180 parts of water; then heat to boiling, and filter the liquid. In 10 parts of the liquid dissolve 19 parts of sugar.

Syrupus Ferri Oxidi (Syrup of Oxide of Iron).—Solution of chloride of iron (ferric), specific gravity 1.480–1.484, 12 parts; water of ammonia, 14 parts; sugar, 85 parts; distilled water, q. s. Mix the solution of chloride of iron with 120 parts of distilled water. Add to it slowly, under constant stirring, the water of ammonia previously diluted with 140 parts of distilled water. Collect the precipitate, wash it with distilled water until it ceases to produce a cloudiness in test-solution of nitrate of silver, and mix it with the sugar in a porcelain capsule. Warm the mixture for a few hours on the water-bath, occasionally stirring, then boil it gently, with occasional addition of distilled water, until 1 drop diluted with distilled water yields a clear, light-brown solution. Then dilute the syrup with warm distilled water until it weighs 136 parts. Preserve the syrup in well-stoppered bottles in a dark place. One part of the syrup diluted with 5 parts of water should not produce a precipitate. Fifty parts of the syrup contain 1 part of ferric oxide.

Syrupus Ferri Hypophosphitis (Syrup of Hypophosphite of Iron)—*Syrup of Ferrous Hypophosphite.*—Hypophosphite of calcium, 30 parts; sulphate of iron (ferrous), 47 parts; sugar, 600 parts; distilled water, q. s. Dissolve the hypophosphite in 300 parts of distilled water and the sulphate of iron in 100 parts of distilled water. Mix the two solutions, let the mixture stand for one hour, occasionally stirring, then filter. To every 370 parts of the filtrate add 600 parts of sugar and dissolve. Keep the syrup in a cool place.

Syrupus Calcii Iodidi (Syrup of Iodide of Calcium).—Lime, 5 parts; iodine, 2 parts; sugar, 200 parts; water, q. s. Triturate the lime to a fine powder with the sugar and gradually add 100 parts of water. Let the mixture stand for several hours, occasionally stirring, then filter. To the filtered liquid add the iodine, and when this is dissolved, 170 parts of sugar. Dissolve the latter without heat. The syrup is clear and colorless, and should be preserved in a well-stoppered bottle.

Syrupus Calcii Phosphatis (Syrup of Phosphate of Calcium).—Phosphate of calcium, 1 part; phosphoric acid, 3 parts; syrup, q. s. Digest the phosphate of calcium with 6 parts of syrup and the phosphoric acid on the water-bath, occasionally stirring until the salt is dissolved; then add 400 parts of syrup.—New Rem., June, 1882, pp. 171–173.

TINCTURÆ.

Alcoholic Menstrua.—A table showing the strength of alcoholic menstrua, referred to commercial alcohol as a standard, is communicated by Dr. A. B. Lyons to "Amer. Jour. Phar.," May, 1882, pp. 209–214.

Tincture of Arnica—Modification of the Officinal Formula.—Mr. Emil L. Boerner recommends diluted alcohol for the preparation of this tincture, as proposed by the committee of the American Pharmaceutical Association on the revision of the Pharmacopœia. Also that the flowers should be ground in a mill instead of bruised in a mortar, and that the coarse powder obtained be packed *dry*. The form of percolator is that recommended by Dr. Squibb as being made from an ordinary percolator, a glass tube being attached by means of a cork to the orifice and bearing a long rubber tube, after the manner illustrated in these Proceedings for 1879, p. 729.—Drug. Circ., December, 1881, p. 179; from Proc. Iowa State Phar. Association.

Compound Tincture of Cardamom—Improved Formula.—In response to a query of the Connecticut Pharmaceutical Association, whether the precipitation in this tincture can be prevented by introducing a substitute for the honey, Mr. Frank M. Wilson has communicated the following formula, which will produce an elegant preparation, free from sediment. Take of cardamom, 4 parts; cinnamon, 4 parts; caraway, 2 parts; cochineal, 1 part. Powder these, pass through a No. 50 sieve, and moisten with sufficient of a menstruum composed of alcohol, 133 parts; glycerin, 12 parts; and water, 44 parts. Pack the moist powder in a cylindrical percolator, gradually pour the remainder of the menstruum upon it, and afterwards diluted alcohol to obtain 200 parts. —Amer. Jour. Phar., April, 1882, p. 165–166.

Tincture of Catechu—Modified Process.—Mr. J. B. Moore recommends the following process for the preparation of tincture of catechu, whereby its tendency to gelatinize is overcome. Moisten two troy ounces of powdered cinnamon with stronger alcohol; pack it into a percolator, and obtain, with stronger alcohol, twelve fluid ounces of tincture. Then rub 3 troy ounces of powdered catechu in a mortar with 16 fluid ounces of boiling water gradually added; transfer the mixture at once to a half-gallon bottle, add the tincture of cinnamon, and shake the mixture frequently until it has cooled. Then filter through paper, observing to pass sufficient diluted alcohol through the filter to make the product measure 28 fluid ounces, and to this add 4 fluid ounces of glycerin, and mix well.—Drug. Circ., September, 1881, p. 131.

Compound Tincture of Benzoin—Short Process.—Instead of preparing this tincture by maceration for seven days, Mr. J. B. Moore suggests a process of digestion whereby its preparation is very much abridged. The benzoin is digested in a close vessel, with a quantity of stronger alcohol, at a temperature of from 140° to 150° for about one hour and a half, with frequent agitation. The aloes, in fine powder, is then triturated with so much boiling water as is necessary to reduce the entire quantity of stronger alcohol to the strength of officinal alcohol, and added, together with the tolu (the author prefers a concentrated tincture, 1 : 2), the storax, and the remainder of stronger alcohol, to the digested benzoin, and the digestion is continued one-half hour. When cool, the tincture is filtered.—Drug. Circ., August, 1881, p. 113.

Tincture of White Ash Bark.—A tincture prepared from the bark of *Fraxinus Americana* (which see) with 20 per cent. alcohol, in the proportion of 4 troy ounces to the pint, has, according to Mr. H. M. Edwards, a bright red color, slightly aromatic odor, and the bitter taste peculiar to the bark. Exposed to the cold it became slightly turbid. —Amer. Jour. Phar., June, 1882, p. 284.

Tincture of Laminaria Flexicaulis (see Iodine-yielding Algæ, under "Materia Medica") is prepared by Mr. James Wheeler by macerating 1 part of the dried and sliced fronds in 8 parts of proof spirit for seven days and straining.—Phar. Jour. Trans., February 4th, 1882, p. 643.

Tinctura Caffeini Composita Dresdensis.—The following formulas are given in "Pharm. Ztg.," October 5, 1881, p. 601:

I. 1 part of caffeine dissolved in 100 parts of an aromatic liquor.—G. Berg.

II. Macerate for a week 100 grams of best flowering Pekoe tea in 1 kilo of diluted alcohol, specific gravity 0.893, and in the tincture dissolve 10 grams of caffeine.—C. Fingerhuth.—Amer. Jour. Pharm., February, 1882, p. 63.

Colorless Tincture of Iodine—Disadvantages of the Use of Hyposulphite of Sodium.—"New Remedies" (October, 1881, p. 304) brings the following under "Formulas:" The mention of the German Pharmacopœia formula, which contains hyposulphite of sodium, may induce some dispenser to attempt the extemporaneous preparation of this application by the use of hyposulphite alone. Tincture of iodine treated with about 5 per cent. of this salt will be decolorized almost immediately, to the satisfaction of the operator; but, in the course of a day or two the compound will develop into an abominable mess, of which precipitated sulphur and sulphuretted hydrogen will be the most evident constituents. It is not generally known how small a proportion of ammonia is necessary to produce a colorless solution of iodine, if sufficient time be allowed for the combination to be effected. About 2 fluid drachms of liq. ammon. fort. suffices for 4 fluid ounces of tinct. iodi, B. P., and 2 drachms of iodine dissolved in 3 fluid ounces of spirit are decolorized by the same quantity. These preparations have but a faint smell of free ammonia, and are unchangeable.

Tinctura Iodi cum Chloral.—Pavesi proposes to increase the effects of iodine when used by way of injections for the purpose of coagulating albumen and retarding putrefaction, by adding chloral to tincture of iodine, and afterwards water. He recommends the following formula: Iodine, 2; chloral hydrate, 3; alcohol, 14. This alcoholic tincture may be diluted with water ad libitum, and forms a golden-yellow liquid of a peculiar, not unpleasant odor, which immediately coagulates albumen, and has hæmostatic, antiseptic, and narcotic properties.—New Rem., March, 1882, p. 87; from Allg. Med. Centr. Zeit., and Phar. Zeit. f. Russl., 1881, No. 48.

Tinctura Ferri Iodidi (*Solutio Iodeti Ferrosi Spirituosi*).—The following formula has been adopted by the Dutch Society for the Advancement of Pharmacy: Iron, in powder, 3 parts; iodine, 8 parts; distilled water, q. s.; stronger alcohol, q. s.

Mix the iron and iodine in a glass flask, with 20 parts of distilled water. When the mixture has acquired a bright-green color filter it, wash the filter with a little strong alcohol, and add enough alcohol to the filtrate to make it weigh 100 parts.

The tincture contains 9.7 per cent. of ferrous iodide, and should be freshly prepared when wanted for use.—New Rem., May, 1882, p. 147.

Extract of Vanilla—Reliable Formula.—Mr. George W. Kennedy offers some general remarks on the selection of vanilla for preparing the extract, and recommends the following formula and process for its preparation, which is very similar to that offered by Mr. Charles Becker, in 1876 (see Proceedings, 1877, p. 113). Take of good Mexican vanilla and granulated sugar, of each 4 troy ounces. Cut the vanilla transversely into small pieces, and reduce it with the sugar to as fine a condition as practicable by pounding in an iron mortar. Moisten the powder with diluted alcohol containing 50 per cent. of alcohol; pack in a percolator, in which allow the whole to macerate for 24 hours, and then displace, at the rate of 40 drops a minute, until 4 pints of extract are obtained.—Amer. Jour. Pharm., June, 1882, pp. 280–282.

Flavoring Extracts.—Mr. Robert F. Fairthorne gives some formulas for flavoring extracts, which he has found to produce very satisfactory preparations.

Extract of Vanilla.—Take of vanilla bean, of good quality, 1 ounce, cut it as small as possible with a sharp knife, transfer it to an iron mortar and beat it with 2 ounces of rock candy into a fine powder; place this into a bottle with 9 fluid ounces of alcohol, allow to macerate, with occasional agitation, for 24 hours, and add 7 fluid ounces of water. Then treat in the same manner for 2 days and filter.

Extract of Herbs for Flavoring Soups, etc.—Take of savory, sweet marjoram, basil, of each, 2 troy ounces; sage, black pepper, of each, ½ troy ounce; thyme, 1 troy ounce; celery-seed, 1½ drachms. Reduce to a coarse powder, moisten with 6 fluid ounces of a mixture of 3½ pints alcohol and ½ pint of water, pack tightly in a percolator, and pour on the remainder of the menstruum. As soon as the liquid ceases to pass through displace with diluted alcohol sufficient to make the product measure 4 pints.

Extract of Celery is made by macerating 6 drachms of bruised celery-seed in a mixture of 14 fluid ounces of alcohol and 2 fluid ounces of water for 2 days; then filtering. The last two extracts are particularly agreeable additions to beef teas.

Boonekamp of Maagbitter—Formulas.—K. Salbach furnishes the following two formulas to the "Pharmaceutische Zeitung:"

I. Oranges, unripe (petits grains), 100 parts; orange-peel, 30 parts; gentian, 60 parts; cascarilla, 30 parts; turmeric, 15 parts; cinnamon, 25 parts; cloves, 15 parts; rhubarb, 7.5 parts; alcohol, 750 parts; distilled water, 165 parts. Digest and filter. Then add oil of star-anise, 2 parts; sugar, 250 parts.

II. Orange-peel, 20 parts; cascarilla, 15 parts; gentian, 15 parts; rhubarb, 10 parts; turmeric, 10 parts; alcohol, 400 parts; water, 500 parts; sugar, 100 parts.—New Rem., March, 1882, p. 90.

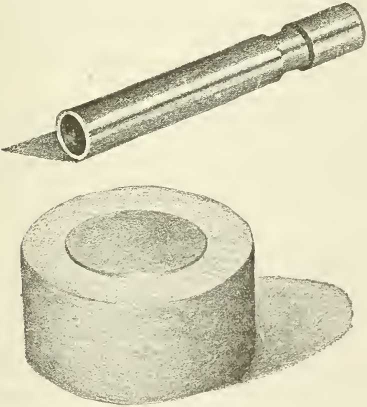
TROCHISCI.

Troches—New Instrument for Shaping.—Mr. Arthur D. Marcy describes the process of making troches, and the instrument (see Fig. 31) devised by him for the purpose, as follows:

To make the instrument, a piece of brass, iron, or steel tubing, about three inches long, five-eighths of an inch in diameter on the inside, and at least one-eighth of an inch thick, is required. The inside of this tube must be perfectly round and smooth, and the ends must be square, in order that the troches may present a regular and smooth appearance. It is better to have it silver- or nickel-plated, to prevent contamination of the troches by the metal, and also that it may be more easily kept clean and free from rust.

The inside of the tube is to be fitted as perfectly as possible with a plunger of hard wood or metal as long as the tube, having a top the same diameter as the outside of the tube, and projecting about an inch beyond it. The writer has used plungers both of wood and metal, and prefers the latter, as the former is liable to shrink, and thereby spoil the looks of the troches. It is essential that the bottom of this should be smooth, in order that a good result may be obtained. It is also necessary to have a smooth, solid surface on which to place the instrument when the troche is being formed. This may be had by placing a piece of steel or iron in a block of wood, as shown in the accompanying illustration. A paste similar to a pill mass is to be made, having it as hard as can be worked (the harder the paste the better the troches will look and the quicker they will dry). It is then to be rolled out on an ordinary pill tile or machine, and divided into the required number of parts; take one of the parts and place it on the anvil, having previously dusted it with lycopodium or starch to prevent sticking. Place the tube over the part, and, with a quick,

FIG. 31.



Marcy's Troche Apparatus.

sharp blow of the mallet on the top of the plunger, force it into shape; raise the instrument from the anvil and, with a light blow, drive the troche from the tube. In dark-colored troches, lycopodium or scented olive oil, and in the white ones, powdered starch, sugar, or acacia may be used to prevent sticking. In making the United States Pharmacopœia troches it will be found that some are considerably smaller than the others, and it will make it more convenient to have another instrument of a proportionately smaller diameter than the one described.—New Rem., February, 1882, p. 34.

Palatable Laxative Lozenges.—According to Mr. R. F. Fairthorne, a very palatable laxative lozenge is obtained by incorporating the *compound licorice powder*, Germ. Pharm., with *prune paste*. A good purgative lozenge, which will not be disagreeable, can also be obtained by incorporating a mixture of 4 ounces each of powdered senna leaves and sugar, ½ ounce powdered jalap, and 6 drachms each of powdered gum arabic and aromatic powder, with sufficient prune paste to make a mass, and dividing this into large troches. The

Prune Paste for the above troches is made by washing and then boiling dried prunes with water until they have become quite soft, removing the kernels, and, when cool, reducing to a pulp in the well-known manner. When finished, the paste should have about the consistence of honey in winter, and to this end evaporation on a water-bath may have to be resorted to.—Am. Jour. Phar., September, 1881, p. 453.

VINA MEDICATA.

Wine of White Ash—Preparation and Uses.—Mr. Thomas S. Wiegand gives a formula for wine of white ash, which has been found by Dr. Charles P. Turner very useful in the treatment of dysmenorrhœa and the troubles that so frequently complicate it. It is as follows: Take of inner bark of the white ash (Fraxinus Americana), in powder No. 40, ℥viij; sherry wine, sufficient for Oij. Macerate the bark for three days, pack firmly in a cylindrical percolator, and displace slowly two pints. The wine has the color of brown sherry and a taste quite peculiar. The usual dose is a teaspoonful three times a day.—Am. Jour. Phar., February, 1882, p. 54.

Wine of Peptone—Formula.—A. Petit gives the following formula for a wine of peptone (see "Albuminoids"): Peptone, 5 parts; Malaga wine, 95 parts.—New Rem., March, 1882, p. 77; from Rép. de Phar., 1881, p. 213.

Vinum Condurango—Preparation.—Dr. Albert Hoffmann, of the Medical Clinic of Basel, again calls attention to condurango of Ecuador as a useful remedy in cancer. Of 20 cases treated with it, improvement was noticed in 40 per cent.; uncured. 10 per cent.; and died, 50 per cent. The most advantageous form of administration was the wine, prepared as follows: 2½ kilos of coarsely-powdered condurango bark are macerated for 2 days in 10 liters of cold water, and the infusion strained; the residue is again mixed with 10 liters of cold water, boiled for an hour, allowed to cool, and again strained; the residue is treated for 2 days with 5 liters of alcohol, expressed, the alcohol distilled off, the residuary liquid mixed with the aqueous liquids, and the whole evaporated to the consistence of an extract, which is to be dissolved in 2½ liters of Malaga wine, decanted from the sediment, and filtered. This preparation has an agreeable bitter taste, and is readily taken by the patients. Prepared with condurango from Venezuela it has, however, an acrid, peppery taste, and is either not taken by the patients or does not agree with them.—Am. Jour. Phar., May, 1882, p. 243; from Schweiz. Woch. f. Phar., 1882, No. 4.

MISCELLANEOUS SUBJECTS.

Formulas of the New York Hospital.—A revised and complete list of formulas, in use in the New York Hospital, has been recently issued, to which reference may be had in Drug. Circ., January, 1881, p. 2–3.

Eclectic Remedies—Physical Characters, Solubilities, etc.—Mr. R. H. Parker communicates some notes on the more important eclectic remedies. With few exceptions the specimens examined emanated from the same American laboratory. The paper considers these remedies individually; their botanical source, physical characters, doses and reputed properties are given, together with their solubilities in rectified spirits, and the results of published analyses of the crude drugs from which they are obtained. The percentage solubilities in spirit and the relative depth of color are tabulated, and may properly find place here. The "solubility in spirit" was obtained by macerating a weighed quantity in successive portions of cold rectified spirits, decanting the clear liquid until complete exhaustion had taken place, collecting the insoluble portion on a tared filter, and taking the weight when constant at nearly 100° C. The "solubility in 20 volumes" was arrived at by agitating at intervals for several days, 0.5 gram of the powder with 10 c.c. of cold rectified spirit, evaporating 5 c.c. of the filtered tincture to dryness, and weighing when constant at 100° C. No account was taken of moisture in either case, which is, consequently, included with the insoluble portion. The "color of tincture" applies to the 1 in 20 strength, No. 1 being about the same depth of color as tinct. aurantii, B. P.; No. 2. as vol. solution of bichromate, B. P.; No. 3, as tinct. cascarillæ, B. P.; No. 4. as tinct. opii, B. P.; No. 5, as tinct. krameriæ, B. P.; and No. 6, much deeper than No. 5. The "color of powder" is designated as follows: No. 1, very nearly that of pulv. ipecacuanha; No. 3, pulv. cinchon. pallid.; No. 5, pulv. cubebæ; and the others in relation to these as the figures stand from 1 to 6.

	Solubility in spirit. Per cent.	Solubility in 20 vol. of spirit. Per cent.	Color of tincture.	Color of powder.
Baptisin, ...	99.2	84.8	3	3
Caulophyllin, ...	95.2	76.2	2	1
Cimicifugin, ...	99.3	89.8	4	2
Corydalin, ...	77.	59.	6	5
Cypripedin, ...	86.6	82.4	6	4
Euonymin, I, ...	49.3	24.6	1	4
" II, ...	40.5	24.9	2	2
Eupatorin (perfo.), ...	64.2	49.4	4	5
Eupurpurin, ...	75.2	52.2	3	2
Gelsemin, ...	65.1	43.8	2	3
Hydrastin, ...	93.8	38.6	3	3
Iridin, I, ...	70.6	57.4	3	5
" II, ...	49.7	40.4	2	4
Leptandrin, ...	38.3	31.4	3	5
Myricin, ...	98.2	94.6	6	4
Podophyllin, ...	93.5	89.8	5	2
Prunin, ...	91.5	80.2	5	6
Sanguinarin, ...	90.6	62.4	4	5
Senegin, ...	70.5	47.	4	3
Xanthoxylin, ...	76.5	52.	4	6

A large number of these preparations exhibited a remarkable uniformity in microscopical appearance, both before and after exhaustion with spirit, this being especially curious in the case of iridin (I), most samples of which are incorporated with an equal weight of some absorbent powder, such as orris or licorice powder, so as to render pulverulent what would otherwise be a soft oleo-resin; in the specimen referred to no vegetable fibre or other organized structure could be detected.—Phar. Jour. Trans., July 16 and 23, 1881, p. 41–43 and 62–66.

Fomentations—Ready Method of Preparing.—A writer in "Michigan Med. News" gives the following directions, which are very convenient and efficient where there is no opportunity to heat much water at a time: Take flannel, folded to the required thickness and size, dampened quite perceptibly with water, but not enough to drip, and place it between the folds of a large newspaper, having the edges of the paper lap well over the cloth, so as to give no vent to the steam. Thus prepared, lay it on the heated surface of the stove or register, and in a moment steam is generated from the under surface, and has permeated the whole cloth sufficiently to heat it to the required temperature.—Drug. Circ., December, 1881, p. 177.

Antiseptic Catgut—New Process of Preparation.—Dr. Kocher, of Berne, having observed the lasting antiseptic effects of oil of juniper, employs it now for the preparation of antiseptic catgut. A suitable quantity of the latter is laid, for 24 hours, in pure oil of juniper, and then immediately transferred to a vessel containing alcohol of 95 per cent., in which it is preserved, under tension, being wound (tightly stretched) upon a flat reel of about 10 inches long. If desired, the catgut may be reimmersed, just before being used, in the oil of juniper; but this is not necessary. If it is placed for a day in glycerin, before it is laid in the alcohol, it becomes more pliable. The gut must be cut at the point of turning the edges of the reel, and for this reason the latter is chosen of such a size that the cut pieces of catgut may be of the proper length.

The same author has lately begun to treat silk in the same manner.—New. Rem., September, 1881, p 270; from Deutsch. Medic. Zeit.

Lister's Eucalyptus Gauze.—The following process for making this new dressing. devised by Lister, is given in "New Rem." (January, 1882, p. 23): Oil of eucalyptus, 1 part; dammar, 3 parts; paraffin, 3 parts. The dammar and paraffin are melted, the oil is added, and the mixture sprinkled or squirted over the muslin laid together in folds. It is then placed in an air-tight heating apparatus, compressed by weights, and exposed to dry heat. Occasionally it is taken out when cold, refolded, and again heated until it is uniform. The finished gauze contains 10 to 11 per cent. of the mixture; five square meters contain 40 grams.

Gossypium Hæmostaticum (Styptic Cotton).—Formula of the Dutch Society for the Advancement of Pharmacy: Solution of chloride of iron, sp. gr. 1.480, 2 parts; distilled water, 12 parts; potash-alum, 1 part; purified cotton, q. s. Dissolve the alum in the water, add the solution of chloride of iron, and wash a sufficient amount of purified cotton in the mixture. Dry it at a temperature below 60° C. (= 140° F.). Pick it, and preserve it in a stoppered bottle.

Gossypium Hæmostaticum et Antisepticum (Styptic and Antiseptic Cotton).—This is prepared, according to the same authority, as follows: Tannic acid, 5 parts; carbolic acid, 4 parts; alcohol, 50 parts; purified cotton, q. s. Dissolve the acids in the alcohol, and soak a sufficient amount of purified cotton in the solution. Dry it at a temperature below 60° C. (= 140° F.). Pick it. and preserve it in a stoppered bottle.—New Rem., March, 1882, p. 72.

Iodoform Cotton—Preparation.—Iodoform cotton has been extensively used at the University Hospital, London, as an antiseptic dressing. Mr. Gerard, the pharmacist to the hospital, says "that the great difficulty encountered in preparing the cotton is to obtain an even distribution of the iodoform. The desired end is best obtained by treating the powdered drug with ether, in the proportion of about 88 parts of ether to 8 of iodoform. In about 4 pints of this mixture ½ a pound of fine clean cotton-wool is soaked for a short time; the wool is afterwards placed in a drug-press. About 3 pints of ether can be squeezed out, and, when dry, the wool contains about 10 per cent. of iodoform. The same objection is made against this wool as against salicylic wool, namely, that its use spreads about the room an irritating dust, with this further disadvantage, that the odor is to most people very offensive. A little glycerin added to the ether used in its preparation checks the former tendency, and the latter drawback is minimized by the addition of eucalyptus oil. The wool ought to be stored in air-tight boxes, and not handled more than necessary before use —New Rem., June, 1882, p. 180.

Carbolic Disinfectant Tablettes are prepared by G. Schweitzer, by intimately mixing 20 parts of powdered talc with 50 parts of plaster Paris and 10 parts of carbolic acid; sufficient water is then added to form a mass, which is poured into small paper capsules prepared for the purpose. The mass soon becomes hard; each tablette is then wrapped in paper and tinfoil, and the whole preserved in a tin box. For use, the wrapper is removed and the tablette placed in a suitable place in a room, in which a pretty strong odor of phenol will be perceptible for 10 or 15 days, according to the temperature.—Am. Jour. Phar., May, 1882, p. 243; from Jour. Phar. d'Als.-Lorr., March, 1882, p. 56.

Koumys—Preparation.—Andrea Pigatti gives the following method for preparing koumys from cow's milk: Cow's milk, 1000 parts; water, 500 parts; yeast, 20 parts; honey, 20 parts; alcohol, 30 parts; wheat flour, 15 parts; millet flour, 5 parts. Mix the milk with the water. Mix the flours with the diluted milk. Incorporate the yeast with the honey by trituration in a mortar, gradually adding the alcohol. Then mix all the ingredients together in a strong bottle, taking care that a considerable empty space remains, and secure the stopper, which must be air-tight, with a string. In order that fermentation may proceed regularly, care is to be taken that the temperature is kept up between 25° and 30° C. (77°–86° F.) for twenty-four hours in summer, and for forty-eight hours in winter, agitating two or three times during that period. The liquid is then strained through muslin and poured into strong bottles, which must be securely stoppered. They are left for twenty-four hours in a temperature of 25° C. (77° F.), being frequently shaken, and are then transferred to a cool place. After a few days the liquid divides into two layers, which may readily be united by agitation. Pigatti asserts that koumys thus prepared keeps for several months unaltered and of a grateful flavor.—New Rem., September, 1881, p. 285; from L'Orosi, 1881, p. 160.

Medicated Fumigating Pastilles.—The following formulas are given in "The Druggist," and are reproduced in Drug. Circ., September, 1881, p. 131.

Iodine Pastilles.—Iodine, 77 parts; powdered marshmallow, 600 parts; nitrate of potassium, 525 parts. Triturate the iodine with a fluid drachm of alcohol until finely divided; add the nitre and marshmallow, previously mixed, and make an intimate mixture of all. Then make a stiff paste by the addition of a sufficient quantity of water, and form into cones containing 5 grains of iodine each. Dry with a gentle heat.

Iodine and sulphur pastilles may be made in the same manner.

Cinnabar Pastilles.—Powdered marshmallow, nitrate of potassium, of each 600 parts; mercuric sulphide, 300 parts. Manipulate as before, using water for triturating the cinnabar.

Stramonium Pastilles.—Powdered stramonium-leaves, nitrate of potassium, of each 600 parts; marshmallow, 150 parts. Make into pastilles with water.

Belladonna Pastilles, and

Digitalis Pastilles, are made in the same manner as those of stramonium.

Tar Pastilles.—Purified tar, 450 parts; nitrate of potassium, marshmallow, of each 525 parts. Make into pastilles, omitting the use of water.

Tolu Pastilles are made in the same way, using a warm mortar to soften the balsam.

Opium Pastilles.—Opium, 39 parts; nitrate of potassium, marshmallow, of each 600 parts. Make a paste of the marshmallow with water, add the other ingredients, and make pastilles as before.

Anti-mosquito Fumigating Pastilles.—These are made from: charcoal, 500 parts; saltpetre, 60 parts; carbolic acid, 40 parts; Persian insect powder, 250 parts, tragacanth, q. s.—Chem. and Drug., July, 1881, p. 292; from Phar. Ztg.

Tooth-wash—Formula.—E. W. Runyon communicates the following formula for a tooth-wash: White oak bark, in fine powder, 2½ ounces; rhatany, in fine powder, ½ ounce; sassafras, in fine powder, 1 drachm; red cinchona, in fine powder, 3 drachms; cardamom, in fine powder, 30 grains; cinnamon, Ceylon, in fine powder, 20 grains; cloves, in fine powder, 30 grains; oil of wintergreen, 1 fluid drachm; oil of anise, ½ fluid drachm; alcohol, 20 fluid ounces; water, 12 fluid ounces. Macerate ten days and filter. Finished product, 1¾ pints.—New Rem., May, 1882, p. 145; from Chemist's Jour., p. 51.

Tooth wash.—E. W. Runyon contributes the following formula: Take of white oak bark. 2½ ounces; rhatany root, ½ ounce; sassafras bark, 1 drachm; red cinchona, 3 drachms; cardamom seeds, 30 grains; Ceylon cinnamon, 20 grains; cloves, 30 grains; oil of wintergreen, 1 fluid drachm; oil of anise, ½ fluid drachm; alcohol, 20 fluid ounces; water. 12 fluid ounces. The drugs are finely ground and macerated in the liquids for ten days; then filter.—Am. Jour. Pharm., April, 1882, p. 180; from Proc. Cal. Coll. Pharm., 1882, p. 51.

Salicylated Mouth-wash is prepared of salicylic acid, 5 grams; alcohol, 150 grams; attar of rose, 2 drops; oil of cinnamon, 5 drops; oil of peppermint, 15 drops; oil of gaultheria, 2 drops; distilled water, 20 grams. It may be colored red with fuchsin, or with a mixture of equal parts of cochineal, cream of tartar, and carbonate of sodium.—Am. Jour. Pharm., February, 1882, p. 63; from Phar. Zeitung, September 21st, p. 573.

Toothache Remedies.—Dr. Atkinson says that *nitrite of amyl* or a 1 per cent. solution of *nitroglycerin* applied to an aching tooth, by means of cotton-wool, will rapidly diminish or abolish the pain.—New Rem., March, 1882, p. 90; from The Practitioner.

Collyrium of the Benedictines.—Hager publishes the following formula: Powdered soot, 100 grams, is digested for several hours with water, 250 grams. Filter, evaporate to dryness and dissolve in acetic acid of 1.040 specific gravity, and distilled water, each 100 grams; alcohol, 50 grams; add extract of hundred-leaved rose petals, 10 grams, previously dissolved in rose-water, 50 grams; macerate for a day and filter.

This collyrium is much employed in France, particularly in the southwestern part thereof, and is said to be particularly useful in scrofulous affections. For use, 20 or 30 drops of it are added to a wine-glassful of lukewarm water, and this is applied to the eyes by means of linen.

Another formula directs 200 grams of good wine to be used in place of the distilled water, rose-water, and alcohol.—Phar. Centralhalle, 1882, No. 10, p. 112; Am. Jour. Pharm., May, 1882, p. 244.

The formula given by Dorvault directs extracting 60 grams of soot, with boiling water, filtering, evaporating to dryness, dissolving in a sufficient quantity of strong vinegar, and adding for every 75 grams of this liquid 1.2 gram of extract of rose-petals.

Safety Paper for Checks, etc.—To prevent the alteration of names, figures, etc., upon documents, N. J. Heckman, of Loughton, England, proposes to add to the glue-water used for sizing, 5 per cent. of cyanide of potassium and sulphide of ammonium, and to pass the paper, after sizing, through a dilute solution of sulphate of manganese or copper. On attempting to remove writing made with ordinary nutgall and iron ink, by means of acids, the writing is immediately changed to blue or red, according to the salt used. If alkalies are used, the paper turns brown. If the attempt is made to make an erasure, the tinted surface of the paper is removed, and the white interior is exposed. Paper thus prepared may also serve, to a certain extent, as a reagent.—New Rem., March, 1882, p. 76.

Ink—New Formula.—Ed. Devilliers (in "Mon des Prod. Chim.") remarks that the substances contained in inks at present in use are all in the main similar, and yet the products differ according to the manner in which the constituents are put together. When bichromate of potassium is caused to act upon the decoction of logwood, there is a formation of a precipitate which is at first black, then brown, and which disappears almost entirely by the action of an excess of bichromate.

The inks at present existing are almost all formed by dissolving in an acid the black lake produced in the reaction above mentioned. The action of the acid has for its object to destroy in part this chromic lake, forming a salt of chrome, which dissolves the compound of oxide of chrome and of unaltered hæmatein. There is, therefore, in this operation the loss of a certain proportion of coloring matter.

It has been found possible to avoid this loss, and to produce thus an ink blacker and more concentrated than was formerly done with the same quantity of logwood. Instead of effecting the solution by means of an acid, it is sufficient to correct the alkalinity produced by the bichromate of potassium, and it is dissolved by means of the chrome salt of some weak acid, such as the acetic, hydrochloric (?), boric, etc. The chromic lake remained then unaltered, and after the characters written are dried, it is found in contact with an excess of chromic oxide, which gives it absolute permanence.—New Rem., March, 1882, p. 77.

Black Ink—Good Formula.—Mr. R. F. Fairthorne communicates the following formula for preparing a good black ink: ℞. Galls (in moderately fine powder), 2 pounds avd.; copperas, 10½ ounces; gum arabic, 10 ounces; sugar, ½ ounce. Water sufficient to make 18 pints. Place the galls in an enamelled vessel, pour on it 6 pints boiling water, and allow it to macerate two days; transfer to a glass percolator, in the neck of which is a piece of absorbent cotton, through which allow the liquid portion to drain. When this is accomplished, pack the galls firmly and displace with sufficient water to produce two gallons with that portion of the infusion which first passed. Then dissolve the gum and sugar in 2 pints of water; add this and the copperas to the infusion of galls. This, after standing about twelve days, will produce a very superior ink. About 8 drops of wood creasote should be added to prevent moulding.—Amer. Jour. Phar., June, 1882, p. 313.

Cheap Logwood Ink.—J. Schmieden recommends the following process: Dissolve extract of logwood, 750 grams, in 14 liters of boiling water, add 750 grams of alum, and when dissolved 200 grams of sulphuric acid, and with continuous agitation 80 grams of yellow potassium chromate, previously dissolved in 500 grams of lukewarm water; finally, add a solution of 100 grams of ferrous sulphate in 300 grams of crude hydrochloric acid, dissolve in the ink 100 grams of gum arabic, and dilute with water to 20 liters. The ink writes with a reddish color, but on drying is deep black.—Amer. Jour. Phar., June, 1882, 308; from Phar. Ztg., 1882, No. 11, p. 78.

Copying Ink, for readily transcribing letters without a press, may, according to Professor Attfield, be readily made from any ordinary ink by reducing 10 volumes to 6 by evaporation, and adding 4 volumes of glycerin. The written page is placed beneath a leaf of an ordinary thin-paper copying-book, and the leaf is used just as one would use a leaf of blotting-paper. Any excess of ink on the page either of the letter or of the copying-paper is removed by placing a sheet of blotting-paper between them and running one's hand firmly over the whole in the ordinary manner. The only precautions necessary appear to be that the strokes shall be heavier during dry weather, and lighter than ordinarily during very wet weather.—Yearbook of Phar., 1881, 422–424.

Aniline Ink—Removal of Stains.—Red aniline ink stains may be removed by moistening the spot with strong alcohol acidulated with acetic acid. Unless the stain is produced by eosine, it disappears without difficulty. Paper is hardly affected by the process; still it is always advisable to make a blank experiment first.—New Rem., September, 1881, p. 285, from Pol. Notizbl., 1881, p. 64.

Ink—Removal of Stains.—An article in the "Journal de Pharmacie d'Anvers" recommends to use for this purpose the pyrophosphate of sodium, which does not destroy cellulose, and yields colorless compounds with ferric oxide. Before treating the spot with this salt, it is recommended to let a few drops of tallow, from a candle, fall upon the spot, and then to wash in a solution of the pyrophosphate until tallow and ink spot have disappeared. If necessary, the operation is to be repeated.—New Rem., September, 1881, p. 285.

Stains and Spots—Prevention and Removal.—"New Remedies" (March, 1882, p. 74–76), reproduces from "The Chemist's and Druggist's Diary" for 1882, a large number of methods and formulas for removing stains and spots of every description from all sorts of substances, which will be found very useful for reference.

Cleansing Fluid for Greasy Bottles.—The following preparation is recommended as an efficient solvent for grease in obstinately dirty bottles: Take of Castile soap in shavings, 4 ounces; carbonate of soda, 2 ounces; borax, 1 ounce; aqua ammoniæ, 7 ounces; alcohol, 3 ounces; sulphuric ether, 2 ounces; add soft water sufficient to make one gallon. The soap should be boiled in the water until it is dissolved, and the other ingredients then added.—New Rem., June, 1882, p. 179.

Coating for Blackboards.—The following formulas are given in Phar. Ztg., 1881, No. 72:

1. Sandarac, 300; shellac, 300; lampblack, 200; ultramarine, 30; ether, 10 grams; 96 per cent. alcohol, 4 liters.—H. Schœneweg.

2. Shellac, 200; camphor, 80; lampblack, 90; ether, 800; alcohol, 1000 grams.—C. Welcker, Am. Jour. Phar., February, 1882, p. 64.

Leather Dressing—Preparation.—A fine, brilliant, elastic dressing for leather can be made as follows: To 3 pounds of boiling water add, with continual stirring, ½ pound of white wax, 1 ounce of transparent glue, 2 ounces of gum senegal, 1½ ounces white soap, and 2 ounces of brown candy. Finally, add 2½ ounces of alcohol and, after the whole is cooled, 3 ounces of fine Frankfort black. The dressing is thinly applied to the leather with a soft brush, and, after it is dried, it is rubbed with a piece of fine pumice-stone and polished with a stiff brush.—Chem. and Drug., September, 1881, p. 397.

Black Leather-varnish.—M. v. Valta gives the following formula for a black leather-varnish, which is said not to crack or peel off: Rosin, turpentine, oil of turpentine, of each 30 parts; sandarac, 60 parts; shellac, 120 parts; alcohol (90 per cent.), 900 parts. Digest, and then add lampblack, 15 parts, previously triturated with a little alcohol.—New Rem., February, 1882, p. 39; from Phar. Ztg.

India-rubber Varnish—Preparation.—Dr. Eder gives the following recipe: Inclose 30 grams of finely cut caoutchouc in a capacious linen bag, and suspend this within a flask containing a liter of benzin, by means of a thread held fast by the stopper, so that the bag remains near the surface of the liquid. In the course of six or eight days the soluble portion of the caoutchouc, about 40 to 60 per cent., will pass into the benzin, while the contents of the bag will expand enormously. The clear solution, which is quite viscous, and contains 1.2 to 1.5 per cent. of caoutchouc, is then carefully separated. The swelled contents of the bag retain one-fourth to one-third of the benzin used, and may be utilized for the preparation of an inferior kind of varnish. A solution of india-rubber in benzin, kept in half-full bottles, is decomposed on exposure to light, which may be seen by the change in the solution from a viscous to a thin fluid condition. Even in the dark this change goes on, but it requires about three times as much time.—New Rem., February, 1882, p. 53.

Varnish for Drawings, Maps, etc.—Formula.—A varnish for paper which produces no stains may be prepared, according to the "Polyt. Notizblatt," as follows:

Clear dammar resin is covered, in a flask, with four and a half to six times its quantity of acetone, and allowed to stand for fourteen days at a moderate temperature, after which the clear solution is poured off. *Three* parts of this solution is mixed with *four* parts of thick collodion, and the mixture allowed to become clear by standing. It is applied with a soft camel's or beaver's hair-brush, in vertical strokes. At first the coating looks like a thin, white film, but on complete drying, it becomes transparent and shining. It should be laid on two or three times. It retains its elasticity under all circumstances, and remains glossy in every kind of weather.—New Rem., April, 1882, p. 113.

Turkish Black Hair Dye—Preparation.—M. v. Valta (in "Phar. Ztg."), August 24th, 1881, gives the following Turkish method of making black hair dye: Very finely powdered nutgalls are triturated with a fatty oil until a doughy mass results, which is then introduced into an iron vessel, and roasted until no more oily fumes are given off. The residue is now rubbed, with water, to a pulp, heated, and while still moist, mixed with such a quantity of a mixture of equal parts of most finely divided metallic iron and copper that the mass still retains the consistence of an ointment. It is next perfumed with ambergris, and preserved in a damp place, whereby it develops its full power of dyeing. Hair, to which this mixture is applied, retains its softness, plasticity, and black color for a long time after one application. The mixture owes its property to the presence of pyrogallic acid, which is formed on roasting the nutgalls.—New Rem., Jan., 1882, p. 22.

Starch Gloss.—This is composed of 1 part each of spermaceti, gum senegal, and borax, 2½ parts of glycerin, and 24½ parts of water. Two or three teaspoonfuls are to be added to ½ pound of boiled starch.—Chem. and Drug., July, 1881, p. 292; from Faerb. Murt. Ztg.

Flour Paste is made by thoroughly mixing flour 4 ounces with water 1 pint, straining through a sieve, adding nitric acid 40 minims, and heating until thoroughly cooked; when cold, 5 minims each of oil of cloves and carbolic acid are added. In the dry climate of California the addition of 5 per cent. of glycerin prevents the paste from drying up too soon.—Am. Jour. Phar., April, 1880, p. 180; from Proc. Calif. Coll. Phar., 1882, p. 51.

Colored Fires—Safe Mixtures.—In consequence of some accidents which have lately happened, Mr. Sailer, of Alstaetten, Switzerland, advises to dispense with mixtures containing chlorate of potassium and sulphur altogether, or at least to use them only with the greatest care, and only when needed. Traces of sulphuric acid adhering to the sulphur may start an explosion; mixtures containing nitrate of strontium alongside of sulphur and chlorate of potassium are also very risky, and should not be kept in stock. Mr. Sailer recommends the following mixtures as absolutely safe. He states that they do not produce quite as handsome a light as those which contain sulphur, but are still quite satisfactory, besides having the advantage of burning without much smoke and poisonous vapors. Red: shellac, 1 part; nitrate of strontium, 5 parts; Yellow: nitrate of sodium, pure and dry, 1 part; shellac, 4 parts; Green: shellac, 1 part; nitrate of barium, 5 parts. The shellac is fused with the color-producing salt, which must be chemically pure, and the resulting mass preserved in tight tin boxes.—New Rem., June, 1882, p. 175; from Schweiz. Wochenschr. f. Pharm.

Chemical Food for Plants.—The "Phar. Zeitschr. f. Russ." recommends the following formula: Sulphate of ammonium, 4 parts; nitrate of potash, 2 parts; sugar, 1 part. Mix. About 40 or 50 grains of this powder should be added to a gallon of water and applied to the plants once or twice a week.—Chem. and Drug., July, 1881, p. 292.

MATERIA MEDICA.

a. Vegetable Drugs.

GENERAL SUBJECTS.

Medicinal Plants—Cultivation in Lincolnshire.—Mr. E. M. Holmes has contributed a paper on the cultivation of medicinal plants, near Market Deeping, a small village in Lincolnshire. The principal plants cultivated appear to be peppermint, henbane, belladonna, dill, caraway, squirting cucumber, and *Lactuca virosa*; but savin, rosemary, wormwood, thyme, and lemon thyme, are also occasionally cultivated for their essential oils, and aconite for the extract of the leaves. The paper contains much useful information, and coming from so close an observer as Mr. Holmes, brief abstracts have been made of the more important points, which, in accordance with the general plan of this Report, will be found under the plants to which they have reference.—Pharm. Jour. Trans., September 17, 1881, pp. 237–239.

New Drugs from the Argentine Republic.—The following are mentioned by Gehe & Co.:

Cestrum pseudoguina, *Mart.*, durazuillo, nat. ord. Solanaceæ. The leaves and rootbark are employed in fevers and abdominal complaints.

Nierembergia oippomanica, *Mart.*, chucu, nat. ord. Solanaceæ. Horses feeding on it are attacked by fever and rigor, called "chucu."

Xanthoxylum Coco, *Gill.*, Rutaceæ; used against chucu.

Gourliea Decorticans, *Gill.*, chanar, Leguminosæ; the inspissated juice of the fruit is used in pectoral complaints; the bark in difficult after-birth.

Zizyphus Mistol, *Griseb.*, Rhamnaceæ; the fruit is diuretic.

Condalia lineata, *Griseb.*, piquillin, Rhamnaceæ; the inspissated juice is laxative; chiefly used for children.

Celtis Tala, *Gill.*, Urticaceæ; an infusion of the leaves is used in pectoral catarrhs.

Martinia montevidensis, *Cham.*, Gesneraceæ; the seeds are used in diseases of the eye.

Prosopis Tintitaco, Leguminosæ; the fruit is diuretic.

Colletia ferox, *Gill.*, s. Barba tigris, Rhamnaceæ; the wood is very hard and indestructible, even in water.

Topas aire, Compositæ; botanical name not known; used in ophthalmic complaints.

Nio, probably identical with *mio-mio*, from Baccharis cordifolia *Lam.*, Compositæ; the herb is a deadly poison to cattle, and, according to P. N. Arata, contains an alkaloid, *baccarine.*—Amer. Jour. Pharm., March, 1882, p. 134; from Zeitschr. Œst. Apoth. Ver., 1881, No. 27.

Heteromeles Arbutifolia, *J. Rœmer—Proximate Constituents.*—This is known as laurel hawthorn, the *toyou* or *tollou* of the Indians, and grows in the Coast Range of California. The leaves yielded to D. D. Lustig hydrocyanic acid, volatile oil, tannin, gallic acid, resins, fat, wax, gum, coloring matter, and chlorophyll. The fruit is eaten by the Indians.—Amer. Jour. Pharm., April, 1882, p. 178; from Proc. Calif. Coll. Pharm., 1882, p. 59.

ALGÆ.

Iodine-yielding Algæ—Direct Use in Pharmacy.—Mr. James Wheeler advocates the direct use in pharmacy of several algæ containing iodine, and among these particularly those belonging to the genus

Laminaria, which appear from his experiments to contain iodine in largest quantity. *Fucus vesiculosus*, which has gained some favor as a remedial agent, and has long been singled out as such, appears to contain but small quantities of iodine, while other species of *Fucus*, such as *F. nodosus* and *F. serratus* appear to contain no iodine at all. The species of *Laminaria* to which Mr. Wheeler particularly refers are the following:

Laminaria Cloustoni.—The fronds of this yield a decoction rich in iodine. In most respects it possesses no advantages over the other members of the genus, but from the facility with which its fronds are powdered it would afford a cheap and possibly useful compound of a resolvent poultice, or, on paper, after the manner of charta sinapis or some other flexible material, supply, on soaking in water, a convenient application to scrofulous joints, etc.

Laminaria Flexicaulis.—This doubtless is the richest of all algæ in iodine, which it yields from the fronds in larger percentage than either the stem or the root. Maceration in water or proof spirit is found to extract its iodine, and the author gives formulas for *Infusion* and *Tincture*, which see, under "Pharmacy."

Laminaria Saccharina.—This is of more complex character than either of the preceding, yielding to decoction 50 per cent. of its weight, and affording iodine, bromine, and mannite, the latter shown by Stenhouse to amount to 12 or 15 per cent. of the plant, and a mucilage which, in Mr. Wheeler's experience, differs materially from that afforded by any other species. Its emulsifying is far superior to that of *Chondrus crispus*, producing a minuter division and separation of the oil-globules. He, therefore, believes it to be specially adapted to the production of emulsions of cod-liver oil, a formula for which, as well as for a decoction, will be found under "Pharmacy."—Pharm. Jour. Trans., February 4, 1882, pp. 642, 644.

Fucus Amylaceus—Determination and Examination of its Carbohydrates.—Mr. Henry G. Greenish has isolated the carbohydrates of *Sphærococcus lichenoïdes*, better known under the name of *Fucus amylaceus*, and subjected them to very careful examination, the results of which are summarized as follows:

1. The gelatinous substance contained in Fucus amylaceus is not identical with lichenin. It is distinguished particularly by its insolubility in ammonio-cupric oxide, the difficulty of its precipitation by alcohol, and the characters of the sugar produced by boiling it with dilute mineral acids. It appears, however, to be identical with the *gelose* of Payen.

2. The gelose is not composed of "pararabin," as is proved by the

method of its isolation and its ready conversion into sugar. On boiling gelose with mineral acid a substance is primarily formed which, by the further action of the acid, is converted into sugar. This sugar is "arabinose."

3. Commercial Fucus amylaceus contains no "mannit." But, inasmuch as the drug during its preparation is repeatedly sprinkled with water, the fresh alga should be examined for "mannit."

4. By extraction with dilute hydrochloric acid a saccharifiable carbohydrate may be isolated. The sugar produced by its decomposition is "glucose." The carbohydrate is not "pararabin."

5. Besides these the drug contains "metarabin," "wood-gum," and "cellulose." The cellulose corresponds in its character with that of the phanerogams.

6. The substance named "paramylan" by the author (see below) requires further examination. It appears to be particularly important that the characters of the substance, free from ash, be determined. It would be interesting also to determine whether this substance is a constant constituent of the algæ, or whether it is contained only in certain species.

The following table shows the composition of the drug:

Moisture,	15.07
Ash,	10.24
Soluble in cold water (mucilage, etc.),	2.70
Soluble in alcohol,	0.10
Metarabin,	1.32
Other substances soluble in NaHO,	3.12
Paramylan,	6.52
Soluble in boiling water (gelose, etc.),	36.71
Wood-gum,	3.17
Cellulose,	10.17
Albuminoid substances,	7.48
Other substances, dissolved by nitric acid and chlorate of potassium, loss, errors, etc.,	3.40
	100.00

Professor E. Reichardt, commenting on the above paper, observes that Mr. Greenish's results are of the highest value, since they determine that the "pectin-bodies," formerly generally accepted, do not exist at all, but are carbohydrates. They prove, furthermore, that the carbohydrates are very variable in their characters and properties; they often differ more or less in the water of combination; or, if their composition is otherwise the same, in their relations to acids and alkalies, the peculiarity of the sugars produced, etc.—Arch. d. Pharm., April and May, 1882, pp. 241–257, and 321–335.

Corsican Moss—Composition.—Dr. Felix Brignone having occasion to study the mixture of marine algæ which is met with in commerce under the name of "Corsican moss," has noticed that what has been stated concerning this product by authors on pharmacology and materia medica is not entirely correct. Thus the Fucus Helminthocorton, which, according to authors, ought to be the predominant species in this mixture, is, on the contrary, rarely found in it. The Corsican moss of the pharmacies is generally composed of several species of the genera *Ceramium, Ulva, Cladophora, Gelidium corneum, Sphacelaria scoparia, Hypnea musaformis, Gigartina sphærococcus*, and others, undetermined because of the bad state of preservation of the product, mixed with which, as is known, is found a considerable quantity of heterogeneous inorganic matters. Dr. Bignone points out that since vermifuge effects are obtained with certainty from the common Corsican moss, although the nature of this product is not at all homogeneous or constant, it seems possible to conclude that the vermifuge property is characteristic of a large number of algæ. The undetermined active principle accompanies the gelatinous principle, for which reason the decoction is the form preferred for the administration of the moss.—Pharm. Jour. Trans., September 24th, 1881, p. 258.

FUNGI.

Ergot of Barley, Wheat, etc.—E. Danneberg draws attention to the fact that the claviceps growing upon barley and wheat are not unfrequently offered for sale to German pharmacists. He is unable to point out any characters of distinction, and considers it probable that these ergots are frequently sold for ergot of rye.—Phar. Ztg., No. 94, 1880, p. 703.

Ergot—Preservation.—Emile Perret directs the ergot to be bruised, and dried at 40° C., then powdered and dried at 80° C., then in a percolator exhausted with strong ether, after which the powder is dried at 35° C. for several hours, the heat being afterwards raised to 40°, to 60°, to 80°, and for a few moments to 100° C. The powder, kept in vials, retains a little ether, which after six months is given off on heating to 110° or 115° C.—Bull. Gén. de Ther., March, 1882, p. 202–204.

Stanislas Martin (Ibid., p. 245) directs attention to the fact that as early as 1839, it had been recommended to wash ergot with alcohol previous to pulverizing it, but that the proposition had been opposed by Soubeiran, and that last year Baudrimont opposed the official recognition of powdered ergot by the new Codex. Insects are not the sole cause of the deterioration of ergot, and it still remains to be proven whether ergot which has been kept for a long time in the state of powder has preserved its medicinal properties unimpaired.—Am. Journ. Phar., May, 1882, 243.

Ergot—Stability when deprived of Fixed Oil.—Mr. Herman Werner speaks favorably of the method of extracting the fixed oil of powdered ergot, which he accomplishes by displacement with petroleum-ether. Powdered ergot so treated has been kept for two years or more, its virtues remaining unimpaired. The amount of oil removed by the process is about 25 per cent. of the ergot employed.—Pharm. Ztg., July 2, 1881, p. 397.

Ergot—Test of Quality.—Mr. Bernbeck has observed that the fixed oil of fresh ergot is perfectly neutral to blue litmus-paper, whilst that of old ergot is decidedly acid. He proposes as a test for its quality that a sample of the powder be extracted by petroleum-ether, and distilling off the solvent. The oil so obtained should be perfectly neutral. The method can be applied to the determination of the freshness of other seeds, such as papaver, cannabis, ricinus, amygdalus, sesamum, etc.—Pharm. Ztg., August 13, 1881, p. 486.

Ergot—Estimation in Flour and Bread.—Dr. Pöhl communicates the following ready method for the quantitative estimation of ergot in rye flour and bread: 15 grams of the flour, or well-dried bread, are digested with 30 cubic centimeters of ether, to which 15 drops of dilute sulphuric acid (1 : 5) have been added. The ethereal solution is filtered, the flour washed upon the filter with ether, until 30 cubic centimeters of filtrate are obtained, and to the latter 20 cubic centimeters of a cold saturated solution of sodium bicarbonate are then added, whereby the reddish-violet coloring matter of the ergot passes into the aqueous solution, which may be removed by means of a separatory funnel. For the comparative colorimetric estimation two artificial mixtures of flour and ergot are prepared, one of 5 per cent. and the other of 1 per cent., which are then subjected to the same treatment.—Am. Jour. Phar., May, 1882, p. 226, from Pharm. Zeitschr. für Russl., No. 20, p. 933.

Ustilago Maidis—(Corn Smut or Corn Ergot)—Proximate Analysis.—Mr. Henry B. Parson has made a proximate analysis of corn smut, and reports the following results:

100 parts of the substance contain:	
Moisture,	8.88
Sand,	4.01
Ash,	
Of which soluble in water:	
Chlorine, Cl,	0.20
Sulphuric acid, SO_3,	0.27
Phosphoric acid, P_2O_5,	0.71
Alkalies, partly carbonate,	2.68
	3.86

Insoluble in water—Soluble in HCl:			
Lime, CaO,	0.07		
Magnesia, MgO,	0.53		
Iron oxide, Fe_2O_3,	0.35		
Phosphoric acid, P_2O_5,	0.25		
	1.20		
Insoluble in water and acid:			
Silica, SiO_2,	0.41		5.47

Ether Extract.

Fixed oil,	4.20		
Volatile amine body,	trace		4.20

Extract by 80 per cent. alcohol.

Soluble in water.			
Precipitated by ammoniacal lead acetate:			
Organic acid, as malic,	0.67		
Yellow color,	0.51		1.18
Not precipitated by ammoniacal lead acetate:			
Glucose,	1.60		
Reddish extractive,	4.32		5.92
Insoluble in water:			
Albuminoid matter,	0.70		
Resin and red-brown color,	2.04	2.74	
			9.84

Aqueous Extract.

Albuminoid, coagulated by heat,	0.70		
Gum,	0.34		
Sclerotic acid,	5.51		6.55
Color (yellow) *organic acid and extractive,*	trace		

Acid Extract.

Starch isomers, by titration,			12.87

Alkali and Hypochlorite Extracts.

Albuminoids,	12.95		
Other dissolved substances,	32.67		45.62

Undissolved Residue.

Pure cellulose,			2.56
			100.00

The term sclerotic acid is used provisionally; as here determined, this substance was prepared exactly as recommended by Dragendorff. It contains nitrogen. The author in conclusion remarks, that the substances which seem most likely to have medicinal effect are the fixed oil, the amine-like volatile substance extracted by ether, and the so-called sclerotic acid extracted by water after the use of alcohol.—New Rem., March, 1882, p. 80–82, from "Report of the United States Commissioner of Agriculture," for 1880, p. 136.

Ustilago Maidis—Examination.—According to Mr. John H. Hahn, corn smut loses 10 per cent. of its weight when heated for several hours. It yields 2.5 per cent. of dark-brown fixed oil, having an acid reaction and the odor of the drug, to ether; water extracts 3 per cent. of yellowish crystals from the powder which has previously been extracted by ether and carbon bisulphide; on incineration the drug yields 4 per cent. of ash.—Am. Jour. Phar., October, 1882, p. 496.

Bacteria—Progress of Investigation.—Mr. G. Marpmann, communicates in "Arch. d. Phar." (3, vol. xv, 31) a lengthy paper on the progress of bacteria investigations. No class of organisms has during the last few years incited so many experiments and has such results to register as this small limited division of the *Protozoa*, to which Nägeli gave the name of "Schizomycetes;" and Mr. Marpmann's paper will therefore be very welcome to those engaged in the study of these interesting organisms, the classification of which, whether among the fungi, or algæ, or among the monads at the commencement of the animal kingdom, is yet undecided. The author considers his subject under two headings: 1. Recognition, Form, and Preservation of Bacteria; and 2. Physiology of the Bacteria. The paper is accompanied by numerous illustrations, and appears to exhaust the subject very completely.—Phar. Jour. Trans., July 30th (pp. 89–90), August 20th (pp. 157–160), and August 27th (pp. 184–186), 1881.

Bacteria.—The presence of an allied organism the cause of the blue appearance of milk, which see under "Organic Chemistry."

Protoplasm—Composition.—Dr. Rodewald and Prof. J. Reinke, were able to obtain protoplasm, in a state of purity, from the fructification of

Æthalium Septicum, a fungus developed in heaps of tan. In its more solid portions the authors have identified the following bodies: Vitellin, myosin, pepton, peptonoid, pepsin, nucleine, lecithine, guanine, sarkine, xanthine, ammonium carbonate, paracholesterin, cholesterin, æthalium resin, a yellow pigment, glycose, non-reductive sugar, oleic, stearic, palmitic, butyric, and carbonic acid, glycerides, paracholesterides of the fatty acids, calcium stearate, palmitate, oleate, lactate, oxalate, acetate, formiate, phosphate, carbonate, and sulphate, magnesium and potassium phosphate, sodium chloride, and iron in an unknown state of combination. The albuminoids scarcely form 30 per cent. of the entire weight.—Chem. News, October 14th, 1881, p. 192; from Biederm. Centralbl., x, No. 1.

New Zealand Fungus—Source and Uses.—Mr. Griffin, U. S. Consul at Aukland, states that among the various products of New Zealand, that of fungus has, within the last few years, attracted considerable attention. The report of New Zealand fungus is confined to one species,

Hirneola Polytricha, which is found upon various kinds of decayed timber in the North Island, is more abundant in damp localities, and is very plentiful on the east coast, south of East Cape, but it exists in the greatest abundance in the province of Taranaki. The inside of the leaf of the *Hirneola Polytricha*, when dried, is a dark reddish-brown, while the outside presents a glossy gray or dove color: the leaf is shaped like a saucer, and varies in size from 3 to 7 inches in diameter. It is flabby in appearance, rough to the touch, and of considerable strength. The fungus is chiefly exported to China, via Sidney or San Francisco, and inquiries made by the New Zealand Government developed the fact that the Chinese value the article highly as a medicine, administered in the shape of a decoction to purify the blood, and also as an article of food, as it forms the chief ingredient of their favorite soup. It is also used in China and Japan for making a valuable dye for silks.—Phar. Jour. Trans., April, 1882, p. 866; from Jour. of the Soc. of Arts, February, 1882.

LICHENES.

Lichen Esculentus—Composition.—E. Lacour found this lichen to contain 7 per cent. of water, and 40 per cent. of ash. The further components were: Fatty matter and wax, 0.73 per cent.; chlorophyll, 0.27 per cent.; gum, 3.3 per cent; uncrystallizable sugar, 2.87 per cent.; crystallizable sugar, 1.2 per cent.; lichenin, 10.75 per cent.; nitrogen bodies, 1.89 per cent.; cellulose, 31.99 per cent. The ash had the following composition, calculated for the entire lichen: Sand, 12 per cent.; ferric oxide, 3.12 per cent; lime, 12.256 per cent.; soda, 0.04 per cent.; carbonic acid, 9.46 per cent.; sulphuric acid, 0.144 per cent.; hydrochloric acid, 0.048 per cent.; phosphoric acid, 2.768 per cent.; loss, 0.164 per cent.; total, 40 per cent.—Arch. d. Pharm., February, 1882, p. 125; from Rep. de Pharm., viii, 449.

LYCOPODIACEÆ.

Lycopodium Complanatum, Lin.—Presence of an Alkaloid.—K. Boedecker obtained a new alkaloid from the aqueous solution of the alcoholic extract of *Lycopodium Complanatum*, Lin., by precipitating with basic lead acetate, treating the filtrate with sulphuretted hydrogen, adding an alkali and agitating with ether. The alkaloid, which the author has named Lycopodine ($C_{32}H_{52}N_2O_3$), is crystalline, melts at 114° C., is freely soluble in alcohol, ether, benzin, water, and amyl alcohol, and has a very bitter taste; its hydrochlorate crystallizes with $1H_2O$. —Am. Jour. Phar., February, 1882, p. 77; from Ann. d. Chem., ccviii, 363–367.

FILICES.

Aspidium Rigidum—Proximate Examination.—The rhizome of this California fern, which has some local reputation as a tænifuge, has been examined by Mr. William J. Bowman, who determined it to contain resin, filicic acid, fat, tannin, glucose, gum, pectin, and starch. The plant is indigenous to the Pacific coast, where it is found in rocky cañons and on the hillsides, and is confined principally to the eastern slope of the Coast Range, from Oregon to Mexico. The rhizomes examined by the author were from 4 to 10 inches in length, closely covered with the remnants of stipes, and, with these, from 1 to 1½ inch thick. They are covered with a brown chaff and densely beset with wiry rootlets. The rhizomes, deprived of the stipes, are from ½ to nearly 1 inch in diameter, and show upon the transverse section an arrangement very similar to that of *filis mas*, the main difference being the vascular bundles, which are found in a circle, and are about six in number. The drug has a peculiar aromatic odor and sweetish taste, which becomes acrid, bitter, and astringent.—Amer. Jour. Phar., August, 1881, pp. 389–391.

AROIDEÆ.

Tonga—Botanical Source.—Specimens of "tonga" (see Proceedings, 1880, p. 199), sent by Mr. R. L. Holmes to Baron Von Mueller, indicate that this Feejeean remedy consists of two plants. One, called by the natives "aro," is

Premna taitensis, D. C., natural order, Verbenaceæ.—In open, dry places it remains shrubby and flowers while quite small, but near watercourses it becomes a tall tree, the timber of which is used in building, the inner bark being the part used medicinally. The other plant, known as "nai yalu" or "walu," is

Raphidophora vitiensis, Seeman, natural order, Araceæ.—This is a creeper, with the stem of the size of a quill, growing freely in sheltered places, climbing over stones and up on trees, when the stem becomes thicker, acquiring an inch or more in diameter. The scraped stems of this plant form the second ingredient in tonga.—Amer. Jour. Phar., September, 1881, p. 439; from Gardener's Chronicle.

Tonga—Chief Source.—According to Brown there reigns considerable confusion among botanists concerning the name of the chief source of "tonga," viz., *Raphidophora vitiensis*, Schott (natural order, Aroideæ), as it is identical both with *Epipremnum mirabile*, Schott, and with *Raphidophora pinnata*, Schott. Brown thinks it should receive the name *Epipremnum mirabile*. This aroideaceous plant appears to have a considerable distribution over tropical countries, being found upon Java, Sumatra, various Sunda islands, and Moluccas (Bali, Amboine, Timor), and in tropical Australia. It has probably also been described and illustrated by Rumphius in his "Flora Amboinensis." It is well known that the commercial drug "tonga" (used as a nervous anodyne) is not exclusively composed of this plant, but contains also another, namely *Premna taitensis*.

GRAMINACEÆ.

Stigmata Maidis—Extraction for Pharmaceutical Purposes.—By treatment with hot water, H. Vassal obtained from the stigmas of maize a reddish-brown extract, which in odor and taste resembled extract of ergot, except that it was rather more bitter. It is free from gummy and albuminous compounds, yields in aqueous solution a black precipitate with ferric chloride, and does not contain an alkaloid. Alcohol of 63 per cent. dissolves most of the extract, and the solution on evaporation yields a granular residue, having an animal odor, a bitter taste, and an appearance resembling ergotin; on incineration it leaves considerable ash, containing a large amount of sodium carbonate. The extract is insoluble in ether and spirit of ether.

The alcoholic tincture of maize stigmas, on evaporation, yields a turbid liquid, from which ether separates a yellowish, tasteless, saponifiable, oily matter; the aqueous liquid on evaporation yields a reddish-brown extract of the same characters as the first product.

Ether dissolves from the stigmas only a fatty matter, having no characteristic odor and taste.

It follows from the above that, for pharmaceutical purposes, maize stigmas are best exhausted with water.—Amer. Jour. Phar., July, 1881, p. 340; from Jour. de Phar. d'Anvers, 1881, pp. 153–155.

Oats—Composition.—L. Grandeau and A. Leclerc give the mean composition of oats, as ascertained from 120 analyses, as follows: Moisture, 12.01; nitrogenous bodies, 9.80; non-nitrogenous extractives, 59.09; fat, 4.58; cellulose, 11.20; ash, 3.32.—Chem. News, July 15th, 1881, p. 37; from Biederm. Centralbl., ix, No. 9.

Flour—Examination for Ordinary Impurities.—A. E. Vogel adds to dilute alcohol, at 70 per cent., one-twentieth of hydrochloric acid.

About 2 grains of the flour in question are shaken up in a test-tube with 10 c.c. of this liquid, and the color, both of the solution and of the sediment, which gradually settles to the bottom, are observed. In some cases a change of color is observed at once, but in others it only occurs on standing and is promoted by heat. Pure flour (wheat or rye remains white, and the liquid is colorless, showing merely a yellowish tint in coarse qualities. Pure barley and oatmeal give a straw-yellow liquid. Corn cockle colors the liquid a full orange; vetches and beans, a fine purple-red.—Chem. News, June 30th, 1882, p. 288; from Zeitschr. f. Anal. Chem., xx, No. 4.

RESTICACEÆ.

Acaroid Resin—Uses, etc.—Dr. William Manlius Smith draws attention to some synonyms for this resin, which he derived from the late Dr. Tully, and which are in addition to those given by Professor Maisch (Am. Jour. Phar., 1881, p. 217). These are, for the resin: *Gummi resina lutea*, *Gummi flavum*, *Yellow gum*, and *Gum lac of the ground* (Tasman.); of the plant: *Acarois resinifera* (Phillips), *Acaroides resinifera* (Pharm. Mass.), *Yellow resin tree* (White), *Botany Bay gum tree*, *Spear yellow gum tree* (R. Brown), *Grass tree*. Dr. Tully found that the most prominent effect of the resin is the diminution of excessive and even colliquative secretions and excretions. He had prescribed it in form of powder with sugar; in pills composed of 1 part each of resin and camphor to 8 parts of soap; and in form of tincture, 4 troy ounces to 1 pint of alcohol. sp. gr. 0.835. Dr. Smith has found the remedy useful in dyspepsia (for which it is used in New Holland), when attended with anorexia, cardialgia, and tendency to diarrhœa. Also in diarrhœa fusa, biliosa, mucosa, and serosa. In the earlier years of his practice he had used it with good results both in the form of powder and tincture, principally in the treatment of diarrhœa, and discontinued it only because of the difficulty in obtaining the drug of fair quality.—Am. Jour. Phar., July, 1881, pp. 329–330.

MELANTHACEÆ.

Zygadenus Paniculatus, Watson—Poisonous Properties of the Bulbs.—Mr. E. Jones states that the bulbs of this plant contain a glucoside, to which their poisonous properties are attributed. Convulsions and speedy death follow the eating of these bulbs. No antidote is yet known for it.—Am. Jour. Phar., September, 1881, p. 439; from Amer. Naturalist, 1881, p. 651.

Black and Green Hellebore—Recognition.—Professor A. Herlandt recommends exhausting the bruised rhizome of Helleborus niger or H. viridis with boiling water; the filtered decoction, on being boiled with one-third its volume of hydrochloric acid, becomes rapidly turbid and acquires a violet tint. On cooling, black flocks are separated, which are collected upon a filter and washed with ether to remove fat and resin, when the paper will be of a deep violet color, depending upon the production of helleboretin. The reaction may be obtained with 0.05 gram of the rhizome, which is to be boiled with 10 c.c. of water. On the addition of ammonia the color of the flocks changes to dirty yellow, but the original color is restored on the addition of acid. The results are less satisfactory if sulphuric acid is employed in place of hydrochloric acid. The rootlets of hellebore give but slight traces of helleboretin. The reaction is not obtained with the rhizome of Actæa spicata or with senega.—Am. Jour. Phar., June, 1882, p. 303; from Jour. Med. Pharmacol. Bruxelles, 1881. p. 347.

Veratrum Album, L., and V. Nigrum, L.—Description.—Mr. Arthur Meyer has contributed a comprehensive paper, embracing the biology and morphology of these plants, and a description of the anatomical structure of their rhizomes and rootlets. The paper is accompanied by twenty-five well-executed woodcuts, sixteen of which are illustrative, the latter descriptive. On account of its length and unsuitability for condensation, reference must be had to the original in Arch. d. Pharm., February, 1882, pp. 81–101.

SMILACEÆ.

Convallaria Majalis—Medicinal Properties.—Clinical and physiological experiments with this herb are reported in the "Centralblatt für Klin. Med.," by Drs. Bojojawlensky and Troitzky (No. 47, 1880; No. 1, 1881). In organic heart disease its effects equal those of digitalis; the urine is increased, serous deposits are rapidly absorbed, nervousness is diminished; cumulative effects were not observed.—Am. Jour. Phar., August, 1881, p. 423; from Med. and Surg. Rep.

LILIACEÆ.

Aloes—Occurrence in Central Madagascar.—Mr. E. G Baker draws attention to the existence of a distinct species of aloes in Central Madagascar, which may become available to medicine. The distinct character of this aloe is shown in a spike of the flowers, which, among other botanical specimens, was sent to England by the Rev. R. Baron, who has paid much attention to the botany of Madagascar. The points of distinction from other aloes are: firstly, the inflorescence is spicate instead of racemose; and, secondly, the perianth is polyphyllous instead of gamophyllous. It is probable that this is the same aloe called by Professor Bojer, in his well-known "Hortus Mauritianus" (1837), *Aloe Sahundra*, Bojer, which, he states, "grows in Madagascar on the sandy shore to the southwest of the Bay of St. Augustine. It is also found in the interior of the island, particularly in the province of Emirna, where it often grows in great abundance. Cultivated in the Royal Garden. A shrub, flowering in April." A second species,

Aloe Leptacaulon, Bojer, is also mentioned by Professor Bojer, as follows: "Grows on the west side of Madagascar, among the shrubs which cover the summit of the mountain ranges that run all along the mouth of the River Omlahi, which empties itself into the sea in the Bay of St. Augustine. Cultivated in the Royal Garden. A perennial, that flowers in September and October. This plant has a very long, slender, and climbing stem."

Recently, also, Dr. Parker forwarded to Kew a list of plants which grow in the centre of Madagascar, and he gives the following description of the aloes which grow there:

"*Vahòna, Aloe Vulgaris.*—Its fruit called 'sahondra.' The juice is used medicinally as a purgative. The American aloe (*Agave Americana*) is common all over Madagascar, especially on stony and waste places, rocks, etc. The socotrine aloe is also said by the natives to exist; it is not nearly so common as the former kind."—Pharm. Jour. Trans., July 16th, 1881, pp. 43–44.

Aloes—Reactions.—Dr. W. Lenz, having occasion to examine critically some of the reactions that have been recommended for the recognition of aloes, communicates the results obtained in "Zeitschr. f. Anal. Chem." (xxi, p. 220). He has given particular attention to Borntrager's test (see Proceedings, 1881, p. 125), which depends on the solution of a substance believed to be peculiar to aloes when the aqueous solutions are shaken with benzin, and which is evidenced by the red color produced in ammoniacal liquids into which the benzol solution is dropped. In private communications, doubts as to the trustworthiness of this so-called "aloetin reaction" had been expressed by Mr. Feldhaus and by Professor Dragendorff, particularly where aloes had to be looked for in mixtures containing rhubarb, senna, frangula, and the like. Dr. Lenz, who applied Borntrager's test to five samples of aloes, as well as to tinctures prepared from rhubarb, senna, frangula, and buckthorn berries, obtained similar reactions from all of these, and has determined the reaction to be due to *chrysophanic acid*, and not to "aloetin" or other characteristic principle of aloes. Dragendorff's more recent method for the detection of aloes in beer, on the other hand, gave unmistakable results. This method consists in treating the suspected liquid with neutral acetate of lead, then shaking with amylic alcohol, and evaporating the alcoholic solution. The residue should have the characteristic taste of aloes, yield precipitates with bromine in bromide of potassium, basic acetate of lead and mercurous nitrate, and reduce alkaline copper and gold solutions on warming. It is also precipitated by tannic acid, but the precipitate is partly redissolved by an excess of the precipitant. If a part of the residue be boiled with concentrated nitric acid and the acid driven off on a water-bath, a substance is left which, when warmed with potash solution and cyanide of potassium, takes a red color. In each case of the five samples of aloes examined, the taste of the residue of evaporation was bitter, while its color was brown in four of them; a sample of *aloë curaçao* (two different samples of which were examined) the color of the residue of evaporation was yellow-brown. None of the other substances examined gave a bitter residue: that of rhubarb was red-brown, that of cortex frangulæ gray, and those of senna and buckthorn berries were greenish. These latter also failed to produce the color reaction with nitric acid, or to afford precipitate with bromine in bromide of potassium or basic acetate of lead; whilst all the samples corresponded well to the tests above given. The method answers well with as little as 0.5 gram of aloes, but Natal aloes was found to give a markedly fainter reaction than the other kinds, except with bromine and with acetate of lead.—Pharm. Jour. Trans., June 3, 1882, pp. 991–992.

Gloriosa Superba—Constituents.—Dr. C. I. H. Warden has already recorded the isolation of the active principle, *superbine*, in a former paper (see Proceedings, 1881, p. 125), and now gives a further description, together with a list of other principles associated with it. When purified, superbine is a yellow non-crystalline neutral principle, to which the formula $C_{52}H_{60}N_2O_{17}$ has been assigned. It is readily soluble in water, alcohol, chloroform, and dilute acids; with tannic acid it gives a white precipitate, but is unaffected by other reagents. It is extremely poisonous, 0.0107 gram being a fatal dose to a large cat. The following is a list of the chief substances which are found associated with superbine: Alpha-resin ($C_{50}H_{59}NO_{14}$); beta-resin ($C_{17}H_{30}O_2$); gamma-resin; fluorescent principle; salicylic acid; salicylate of methyl. The alpha and gamma are acid resins; beta-resin is neutral; all are physiologically inert.—Chem. News, January 13th, 1882, p. 13.

Asphodelus Bulbosus—Mucilage from the Corms.—Professor X. Landerer states that in the East a mucilage containing dextrin is prepared for shoemakers and bookbinders by strongly roasting the corms of Asphodelus bulbosus, called "Sphendakla." The mucilage, or rather the powder from which it is prepared, is called "Tsinisse" in Turkish. Alcohol can also be prepared from the starchy corms. Professor Landerer has learned that the Jews of Thessalonika, who devote themselves to the falsification of many natural products, adulterate *salep powder* with the above-named "Tsinisse." The asphodel was, and still is, a funeral plant. It is found in all Oriental churchyards, and has not entirely disappeared from the funeral feasts. In the oldest Hellenic times it was sacred to Persephone and to mourners. It was also a wonder plant, or *heroicon*, a remedy for snake-bites and scorpion-stings, and was worn as a charm against poison and enchantment.—Chem. and Drug., July, 1881, pp. 293, 294.

IRIDACEÆ.

Iris Versicolor—Constituents.—Mr. D. W. Cressler has made a proximate examination of the rhizome of this plant, and has determined, besides volatile matter, starch, gum, tannin, sugar, acid resin, and fixed oil, a substance which is probably an alkaloid. It may be obtained in quantities by treating the drug with acidulated water, concentrating the filtrate, again filtering, precipitating gummy matter by alcohol, decanting the clear liquid, rendering it alkaline by soda, and extracting it with ether. The ether-solution yields on evaporation a substance which is soluble in acidulated water, from which it is precipitated by Mayer's test, iodine, tannin, and picric acid.

Mr. William E. Jenks has also experimented upon this drug. He finds that a powder, having its therapeutic properties unimpaired for a great length of time, may be obtained by carefully drying the transversely sliced rhizome in an atmosphere heated to 100° F., then pulverizing, and preserving in well-closed vessels carefully excluded from light and air. The *oleo-resin* of blue flag is readily obtained by carefully concentrating a tincture made with alcohol, specific gravity 0.835. It is a dark reddish-brown liquid, of a dark viscid consistence, and of a peculiar odor and acrid astringent taste. By solution in ether and evaporation, the astringency is removed in a great measure, and the oleo-resin becomes more acrid and lighter in color.—Amer. Jour. Phar., December, 1881, pp. 601–602.

Crocus Sativus—Cultivation in Kashmir.—According to Dr. Downes *Crocus sativus* is the only plant grown in Kashmir the stigmata of which compose "hay saffron." The famous saffron fields are situated in the vicinity of Pampur, on a plain fully 50 feet above the valley. The bulbs grow on soil said to have been specially imported for the purpose. They are planted out in June, and the stigmata are collected in October, the produce in dry seasons averaging nearly a ton. The four stations for saffron cultivation, called "Narewas," are flat treeless tablelands on the borders of the hills, 50 to 150 feet higher than the Kashmir Valley, which is 5200 feet above the sea-level. They are little, if at all, irrigated. The soil is stiff clay. The author is informed that saffron has been successfully cultivated in the gardens of the city of

Kashmir, and he has further evidence which leads him to express the opinion that a special soil is not needed for the cultivation of *Crocus sativus*.—Phar. Jour. Trans., July 2, 1881, p. 9, from Gardener's Chronicle.

Critonea Dalea, D. C.—A Cheap Substitute for Tonka Bean.—Mr. E. M. Holmes draws attention to this plant, which is known in Jamaica by the name of "cigar-bush," or "cigar-maker's vanilla." It grows to a height of 6 to 10 feet; has lanceolate, tapering, thin, smooth, somewhat shining, distantly serrulate, opposite leaves, 4 or 5 inches long, and ½ to 1 inch broad in the widest part. When held up to the light they are seen to be marked with pellucid lines and points, something like those of the balsam of Peru tree. The leaves are very fragrant, the odor, which is very persistent, resembling that of new-mown hay or tonka bean, and they might well form a cheap substitute for the latter, while a tincture might be useful for disguising the odor of iodoform. The name "cigar-bush" must not be confounded with "tobacco-bush," the name applied to another Jamaican plant, *Hedyosmum nutans*, Sw., which see elsewhere.—Phar. Jour. Trans., January 14, 1882, p. 581.

AMOMACEÆ.

Zingiber Officinalis—Proximate Constituents.—In a former paper (see Proceedings, 1880, p. 112), Mr. J. C. Thresh had enumerated the constituents of the rhizome of *Zingiber Officinalis*. He has since subjected some of these to ultimate analysis, with the following results:

Neutral Resin.—This has the empirical formula $C_{16}H_{21}O_5$. It is only acted upon by melted potash with great difficulty, resolutely refusing to mix therewith. By further treatment a crystalline acid, giving a green coloration with ferric chloride, and which is most probably protocatechuic acid, is separated.

Resin a.—This has the empirical formula $C_{46}H_{50}O_{10}$. Amongst the products resulting from its fusion with caustic potash is an acid reacting with ferric chloride like the acid obtained in a similar manner from the neutral resin.

Resin β.—This has the empirical formula $C_{43}H_{58}O_8$.

Terpene Polymer.—By suitable treatment a polymeric terpene, constituting a thick oily substance, of a straw color with a bitter and somewhat pungent taste and slightly aromatic odor, was obtained. It contains only carbon and hydrogen and conforms in composition to $_n(C_{10}H_{16})$.

The Active Principle, Gingerol, was not obtained, by any treatment to which it was subjected, in a condition in which the author could feel assured that it was really the active principle in a state of purity.—Phar. Jour. Trans., March 4, 1882, pp. 721–722.

Galanga Root.—Isolation and characters of the different crystallizable yellow coloring matters, Kaempferide, Galangin, and Alpinin, contained in it, which see, under "Organic Chemistry."

SANTALACEÆ.

Leptomeria Acida—Acidity of Fruit due chiefly to Malic Acid.—The fruit of the "Australian currant," according to E. H. Rennie, owes its intensely sour taste chiefly to malic acid, which, besides small quantities of citric and tartaric acids, is present to the amount of more than 40 per cent. in the residue obtained by neutralizing the juice with sodium carbonate and evaporating to dryness. The ash contains a considerable quantity of potassium carbonate, with mere traces of calcium carbonate.—Am. Jour. Phar., February, 1882, p. 73; from Jour. Ch. Soc., 1881, p. 1033; J. Roy. Soc., N. S. W., xiv.

LAURACEÆ.

Cinnamon and Cassia Barks—Approximate Determination of Quality.—Mr. J. Woodland finds that the volatile oils of cinnamon and of cassia possess the property of absorbing iodine to a considerable extent, and that to this property is due the gradual loss of the blue color produced by iodine in the decoctions of the respective barks. Of the two oils, that of cinnamon seems to possess this property to a much greater extent than that of cassia, though not in any constant proportion, the amount of iodine that is absorbed by the oils being dependent upon the age of the sample, as the greater the age of the oil the smaller is the quantity of iodine solution absorbed by it. Further experiments have shown that although the total amount of oil cannot be determined in a bark on account of the time taken by the oil to absorb the iodine, the quality of a bark of cinnamon or cassia can be quickly ascertained. To a decoction of 1 gram of the bark decinormal iodine solution is added until, after shaking well, a distinct color is seen in the froth. In this way samples of cinnamon bark required 6.9, 4.5, 4.9, and 11.8 c.c. of the reagent respectively; and cassia bark, 3.7, 2.1, 3.3, and 2.3 c.c. The author states that a sample of cinnamon of average quality ought, if 1 gram be boiled with water and then cooled, to take at least 6 c.c. of the decinormal iodine solution to color the froth. Cassia bark requires a much smaller quantity of iodine to color the froth; first, on account of the oil not absorbing so much, and secondly, on account of the bark containing a smaller percentage of oil.

Experiments were also made to determine a ready method of distinguishing between the two oils. It was found that if 1 part of nitric acid, sp. gr. 1.36, be added to 2 parts of *oil of cinnamon*, and the mixture shaken, a bright orange-colored liquid is first obtained, on the surface of which floats an orange resinous substance, which slowly becomes deeper in color until a beautiful cherry-red color is visible, by which time it has changed to a liquid that floats on a lighter-colored substratum, which also in a short time becomes nearly of the same tint; bubbles then commence to appear, and shortly afterwards spontaneous ebullition occurs, with the evolution of nitrous fumes and vapors of benzoic aldehyde; by the time this ebullition has ceased the amber-colored liquid commences to clear itself, and finally a *clear* amber liquid is left, with orange globules floating on the surface.

If the same experiment is repeated with *oil of cassia*, a dirty-green, supernatant resinous mass, slowly turning to brown, is seen floating on a yellowish liquid, and no further change is undergone; if a large excess of the acid be added after the first addition, the resinous mass changes to a deep reddish-brown, and the subnatant liquid takes a cherry-red color. The same reaction occurs if a large excess of nitric acid be added to oil of cassia at first, but in neither of these cases is there any spontaneous ebullition or evolution of the nitrous fumes and benzoic aldehyde vapors.

If *oil of cassia* be mixed with *oil of cinnamon*, the reaction with nitric acid takes place as with oil of cinnamon, but more tardily, according to the amount of oil of cassia present, and at the end of the process a *turbid* subnatant liquid is seen instead of a clear one.—Yearbook of Pharm., 1881, pp. 476–479.

Persea Lingue (Laurus Caustica)—Characters and Composition of the Bark.—This bark is described by P. N. Arata as occurring in commerce in curved pieces 10 to 15 cm. broad and 5 to 9 mm. thick; it has a peculiar aromatic odor, the sp. gr. .896, a rugged outer surface, a dark orange-color, lighter around the irregular cracks and variegated with zones of white spots, and a smooth inner surface, with slight longitudinal ridges and of a color like that of the outer surface. The tree is 25 to 30 feet high, has a stem about 2 feet in circumference, and is widely diffused in Chili between the provinces of Acongaqua and Chiloé, and in the Argentine Republic between Limay and Neuquen. The bark was found to contain moisture, 2.53; constituents soluble in ether (resin, volatile oil, little tannin), 17.71; constituents soluble in alcohol (tannin), 24.63; constituents soluble in water (proteids, gum, sugar, etc.), 14.55; constituents soluble in hydrochloric acid (calcium-oxalate, etc.), 2.63; wood fibre and loss, 37.95 per cent. Lingue-tannin, $C_{17}H_{17}O_9$, is reddish-white, soluble in alcohol, acetic ether, acetone, methyl alcohol; slightly soluble in water; gives a green color with ferric salts; and yields, on dry distillation, water and catechol; on treatment with nitric acid, oxalic and picric acids;

and on heating with potassa solution, phloroglucol and probably protocatechuic acid; it is analogous to the tannin of quebracho colorado, catechu, etc.—Am. Jour. Phar., February, 1882, p. 73; from Jour. Chem. Soc., 1881, p. 602; Anal. Soc. Scientif. Argent., x, 193.

MYRISTICACEÆ.

Bombay Mace, Characters of Distinction from Ordinary Mace.—Bombay mace, which is occasionally found in the market, according to A. Tschirch, differs from ordinary mace in several respects, and is doubtless obtained from a different species of Myristica. The lobes of the arillus are longer and thinner than those of true mace; it is of a dark brown-red color, and on the inside has adhering to it a thin parchment-like crumbled membrane, which is never found in true mace. The epidermal cells are radially elongated, narrow and twice as high (those cells of true mace are tangentially elongated and low); their membranes show the cellulose reaction with iodine and sulphuric acid beautifully, and with zinc chloride and iodine swell and turn faintly blue. The oil-cells are very numerous, located near the epidermis on both sides, often close together in groups of two or three, oval in shape, somewhat radially elongated, and contain a dark yellow, usually resinified oil, frequently also brownish resin.—Am. Jour. Phar., January, 1882, p. 13, from Phar. Zeitung, 1881, No. 74.

POLYGONACEÆ.

Rhubarb—Examination of Varieties cultivated at St. Petersburg.—The soil and climate of St. Petersburg corresponding to that of their original locality, some rhubarb roots, cultivated from seeds originally brought from Asia by Przewalski, were subjected to chemical examination by F. Beilstein, the yield of chrysophanic acid and emodin being determined. Some of the roots were of six years' growth, and they were derived from

1. *Rheum officinale.*
2. *Rheum palmatum*, grown on sandy soil.
3. *Rheum palmatum*, grown on clay soil.

The peeled, dried, and powdered roots were exhausted with benzol, the benzol distilled off, and the residue of the distillation boiled with soda solution. The mixture, after cooling, was filtered. The undissolved portion contained the chrysophanic acid, the filtrate, the emodin, the latter being precipitated by acids. The chrysophanic acid and emodin were both subjected to suitable processes of purification. No. 2 gave the largest yield, viz., 0.75 per cent. chrysophanic acid, and 0.25 per cent. of emodin in crude condition. No. 3 gave 0.50 per cent. of crude chrysophanic acid, and a very small quantity of emodin. No.

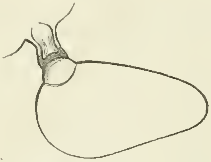
1 a total of 0.50 per cent. crude chrysophanic acid, and doubtful traces of emodin. These large yields of active substance make it desirable that further experiments be made with the culture of true rhubarb root in Russia.—Arch d. Pharm., June, 1882, p. 451, from Phar. Zeit. f. Russl., 1882, No. 16.

Rhubarb—Presence of Fixed Oil.—Mr. John Nesbit, suspecting the presence of fixed oil in some powdered rhubarb, has confirmed its presence, not only in numerous samples of the same, but also in the different samples of the whole root. But while it was present in very small percentage only in the latter (from 0.20 to 0.40 per cent.), the powders almost uniformly contain a much larger percentage. Thirty samples were examined, of which seven contained 0.40 per cent. or less; twelve contained between 0.40 and 1.0 per cent.; eight contained between 1.0 and 2.0 per cent.; and three samples contained respectively 2.3, 2.4, and 2.75 per cent. of fixed oil. The results seem to indicate that the practice of adding oil, when powdering rhubarb, prevails to a considerable extent, either for the purpose of giving the powder a brighter appearance or to facilitate the grinding process. A characteristic property belonging to the powders containing 1 per cent. of oil and upwards is that of forming little globular masses when shaken in a dry bottle, or even on a piece of paper, the greater the percentage of oil present the larger the globules. The author refers to this, as some pharmacists consider these globules to indicate a fine sample of rhubarb.—Chem. Jour., March 24th, 1882, p. 179–180.

CHENOPODIACEÆ.

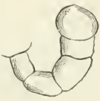
Chenopodium Anthelminticum, L.—Microscopic Structure of the Leaf and Fruit.—Dr. H. Paschkis describes the microscopic structure of the leaf of *Chenopodium anthelminticum, L.*, as follows: The epidermis of the upper side consists of polygonal tubular cells, with tolerably numerous stomata. The mesophyll shows, below a simple palisade layer, some four or five layers of symmetrical roundish cells, containing chlorophyll. Both rosettes of oxalate of lime and crystalline sand are very abundantly imbedded in the mesophyll. The latter especially occurs in large quantity along the vascular bundles; it is there stored up in prismatic cells, considerably elongated tangentially (0.012 l., 0.05 b.), which accompany the vessels in the form of long rows. The epidermis of the under side is distinguished from that of the upper side by the many times indented and somewhat larger flat cells. The numerous stomata are almost circular (0.021 : 0.015). Upon both sides, but especially below, are implanted glands (Fig. 32) which are distinguished through their peculiar shape. Upon a one- or two-celled stalk, strongly compressed together from above, is a moderately thin-walled capitulum, or, more correctly, vesicle. This latter is in most cases ovate (0.112 : 0.08), and is connected at its broad end (in its longest diameter) with the stalk, the pointed end lying upon the surface of the leaf. The contents consist partly of a homogeneous light to dark yellow mass, or flaky fragments; here and there also of crystalline concretions as well as crystalline forms. It becomes darker in color with caustic potash, and dissolves after prolonged boiling with alcohol. Between the glands, not numerous, but in greater quantity upon the nerves and on the stalk, there occur two kinds of hairy appendages. One kind consists of ordinary club-shaped several-celled hairs, with yellowish or colorless contents (Fig. 33); the other bears upon a several-celled stalk, resting upon two raised foot-cells, a cell running off at a right angle, more seldom at an acute angle (Fig. 34). This latter cell, usually considerably larger than the stalk, is provided at the hinder end with an arched heel; the front free end is truncate. Frequently this cell is itself again bent backwards towards the surface of the leaf. Occasionally it is separated by a dividing wall into two parts; very rarely instead of the hinder end a second cell commences, lying in a line with the first cell, converting the hair to a T-shape (Fig. 35). This hair has colorless contents. The leaf of

FIG. 32.



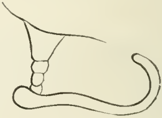
Chenopodium Anthelminticum—Gland.

FIG. 33.



Chenopodium Anthelminticum—Club-shaped Hair.

FIG. 34.



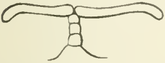
Chenopodium Anthelminticum—Hair.

C. Ambrosioides presents no microscopic variations from the above. Those of

C. Botrys show differences in the hairs and the total absence of the large oil-glands, while those of

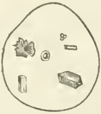
C. Vulvaria are distinguished microscopically in the absence of crystalline sand in the mesophyll, in the apparent absence of oily contents

FIG. 35.



Chenopodium Anthelminticum—T-shaped hair.

FIG. 36.



Chenopodium Vulvaria—Gland with Central Stalls and Crystals.

in the glands, which are also globular (Fig. 36), and contain large and small crystals of the most diverse forms, consisting for the most part of oxalate of lime. The seeds of

C. Anthelminticum, which are readily removed from the fruit by slightly rubbing between the fingers, and are very shiny red to blackish-brown, examined microscopically show under a relatively stout epidermis a mesophyll consisting of three or four dense layers and a very delicate lower epidermis. In the former there is present a considerable quantity of crystal sand (oxalate of lime). Glands analogous to those of the leaves are found but sparingly and only at the base of the calyx. Also in the yet more delicate pericarp can be detected a thin outer and a thicker inner epidermis, and a middle layer, which consists of a few rows of oval cells. Upon the outer epidermis occur numerous glands, which in their structure and contents are quite similar to those found on the leaves, and differ from them at most by the somewhat greater length of the stalk. They are generally so arranged that the top appears to lie toward the apex of the fruit, so as to have upon the surface of the pericarp the appearance of scales. The dry brittle covering of the seeds shows under the microscope an outer epidermis covered with a thick yellow-brown cuticle, a middle layer consisting of two or three rows of thick-walled cells, and a more delicate inner epidermis. The imperfectly circular embryo is surrounded by albumen to about three-fourths; the albumen bears an abundance of starch in its large hexagonal cells.—Phar. Jour. Trans., July 16th, 1881, pp. 44–45; from Zeitschr. Oest. Apoth. Ver.

Phytolacca Decandra—Varieties, Therapeutic Value, etc.—Dr. Westerfield speaks highly of the value of poke-root as an alterative, provided the root is properly collected and the saturated tincture, or other preparation, carefully made. He, together with his father, has recognized in the South two varieties of the plant, the distinction being perhaps not so much botanically as in their general appearance. The one is a tall, tree-like plant—in some specimens twelve feet high—flowers few, fruit small and sparse, main stalk and branches comparatively slender, and of a light green color. The other, and the one preferred by the author, is more compact in general appearance, full, dense foliage of a dark-green color, fruit large and abundant, main stalk and larger branches of a deep rich purple. The root, the part used, is thick and fleshy, abundant with starch and mucilaginous matter of a sweet, mawkish taste, tardily but decidedly pungent to the mouth, a peculiarity not found in the fluid extract nor in the root of the northern climate (Chicago). It is best gathered in November, and must be carefully dried in the shade. Dampness is fatal to it, fermenting the starch, and for this reason it will not keep until the following season, and is generally inert as found in the shops. The liquid preparations of the root, after digestion, should never be evaporated except *in vacuo*. Dr. Westerfield believes that if these conditions are observed, we have in *Phytolacca Decandra* a remedy which may be depended upon.—Drug. Circ., October, 1881, p. 157; from Chicago Med. Jour. and Exam., September, 1881.

Phytolacca—Proximate Examination of the Root.—Mr. William F. Pape has made a proximate examination of poke-root, and finds gum, starch, tannin, fixed oil, coloring matter, and acid resin. It possibly also contains an alkaloid, but this point requires further experiment. On incineration, the root (air dry? Rep.) yielded 10.73 per cent. of ash, of which 66.35 was soluble in water, 24.96 in hydrochloric acid, and 6.71 per cent. soluble in hot solution of soda. Besides the silica, the ash contained potassium, calcium and iron, in combination with chlorine, sulphuric and phosphoric acids. Mr. Walter Cramer has also made a

Proximate Examination of the Berries, his first object being to ascertain the nature of the coloring matter. On account of its susceptibility to change, however, he has failed to arrive at correct conclusions as to its character. Besides coloring matter, he determined gum, sugar, and malic acid. The fresh berries contain 70 per cent. of moisture, and the dry powdered berries yield 5 per cent. of ash, of which 62 per cent., containing a considerable amount of potassium, is soluble in water.—Am. Jour. Phar., December, 1881, pp. 597-600.

Phytolacca Decandra—Presence of a New Acid.—A. Terreil has found in the alcoholic extract of the berries the potassium salt of a new acid, *phytolaccic acid*; the aqueous solution of this salt is not changed by hydrochloric acid in the cold, but when heated a stiff jelly is produced, which is soluble in strong alcohol. The isolated acid is amorphous, yellowish-brown, transparent, non-deliquescent, very soluble in alcohol and water, does not precipitate salts of the earths, but on boiling reduces silver salts. Its aqueous solution is converted into a jelly by strong acids; its alkaline salts are not crystallizable.—Am. Jour. Phar., July, 1881, p. 325; from Compt. Rend., xci, 856–858.

Phytolacca Dioïca—Constituents of the Fruit.—Ballaut has determined the constituents of the fruit of this species of *Phytolacca*, which, according to De Candolle, is indigenous to Brazil or Mexico. In Paris it is known only as a greenhouse shrub, but it flourishes on the Algerian coast. Its wood is very spongy and fibrous, and never acquires a true ligneous structure. The fruit is a fleshy greenish-yellow berry, forming grape-like clusters weighing 30–40 grams. It falls off naturally about October, and is then very sweet. When pressed it yields about 74 per cent. of a thick, gummy, slightly acid syrup, with a somewhat nauseous odor, sp. gr. = 1.100. This syrup does not ferment spontaneously, and clarifies very slowly when exposed to the air. After filtration it has a brown color, and its dilute aqueous solution is distinctly fluorescent. This syrup contains 24.6 per cent. solid matter, which, on ignition, leaves 1.86 per cent. of ash. In addition to this it contains: water, 75.40; chlorophyll, wax, resin, essential oil, and volatile acid, 0.45; reducing sugar, 3.20; non-reducing sugar, 11.20; undetermined organic acid, 2.60; gum, 4.40; albuminoid matter, pectic substances, and pectose, 0.89 per cent. The resin is very bitter and insoluble in ether. The ethereal salt of the volatile acid has an odor recalling that of butyrate of ethyl. The undetermined acid has some of the properties of the phytolaccic extracted by Terreil from the fruit of *Phytolacca decandra*.—Jour. Chem. Soc., December, 1881, p. 1152; from Jour. de Pharm. et de Chim. (5), 4, 232–234.

PLANTAGINACEÆ.

Psyllium Seed—Use in Constipation.—Mr. Noel Gueneau de Mussy proposes using psyllium or sarragota seed for constipation. Psyllium is a species of plantain, commonly called fleawort, because of the appearance of its seeds, which are quite small and very mucilaginous. A tablespoonful in half a glass of water is taken before dinner. He says that with a number of persons this method has proven as successful as with the Spanish lady from whom he obtained it. In other cases, however, he was obliged to alternate with more powerful laxatives, such as aloes or rhubarb, so as to keep up the effects. It is probable that psyllium seed, like others of its kind, is not persistent in its effects, although in a number of cases it seems to have been so.—Am. Jour. Pharm., August, 1881, p. 424; from Med. and Surg. Rep.

LENTIBULARIACEÆ.

Pinguicula Vulgaris, Lin.—Occurrence of Albuminous Crystals in the Leaves, etc.—This plant, popularly called "butter-wort," according to Professor Russow, contains crystalloids in the epidermis of the upper and more numerous of the lower surface of the leaves, in the epidermis of the peduncle, in the stipe cells of the glandular hairs, and in the pointed hairs of the throat of the corolla. These crystalloids form quadrangular plates with sharp edges, are packed together like coin in rolls, and have a diameter of 4 micromillimeters. The rather copious secretion of albuminous crystals in the cells of the vegetative region may possibly have some relation to the well-known insectivorous properties of butterwort.—Am. Jour. Pharm., April, 1882, p. 178; from Ph. Zeit. Russl., 1881, p. 891; Sitz. Dorp. Naturf. Ges.

SOLANACEÆ.

Belladonna—Comparative Value of Wild and Cultivated Plants.—Mr. A. W. Gerrard communicates the results of a comparative examination of the differences existing between wild-grown and cultivated belladonna. The wild kind had grown in poor limestone soil, incapable of producing ordinary cultivated crops; the cultivated plant was grown at Hitchin, on a chalk subsoil, with 12 inches of stiff loam on the surface, and was believed to be of the third year's growth, the wild plant being judged to have been three or four years old. Both kinds were dried at a temperature of 100° F., and divided into its various parts of root, stem, leaf, and fruit, and well powdered, each part being estimated for its percentage of alkaloid with the following results:

WILD PLANT.		CULTIVATED PLANT.	
Part used.	Percentage of alkaloid.	Part used.	Percentage of alkaloid.
Root,	.45	Root,	.35
Stem,	.11	Stem,	.07
Leaf,	.58	Leaf,	.40
Fruit,	.34	Fruit,	.20

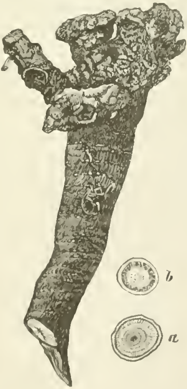
It is worthy of note that in both cases more alkaloid is obtained from the leaf than from the root, this being contrary to the general belief, and that the wild plant is the richest in alkaloid. Nevertheless the cultivated plant must be regarded as of excellent quality, judged by commercial leaves, three samples of which yielded .07, .11, and .22 per cent. of alkaloid respectively. Whether this difference is due to the growth of the latter in soil unsuited to them, or to deterioration in keeping, the author is unable to decide.

Physiological experiments made with the alkaloid from the wild and cultivated plants, by Professor John Tweedy, seem to point to the greater energy of that from the wild plant, while, at the same time, it appears to be also less irritating than the other. Also that its solution has kept better under identical conditions.—Yearbook of Pharm., 1881, pp. 482–484.

Belladonna Root—Relation of Starch to Atropine.—Numerous experiments made by Mr. Fr. Buddel with fresh and old belladonna root, appear to indicate a certain relationship between the amount of starch and the amount of atropine contained in them. Samples containing very little or no starch are generally also very deficient in alkaloid. It appears probable that the roots containing no starch, or very little, are obtained from young plants.—Arch. d. Pharm., June, 1882, pp. 414–416.

False Belladonna Root—Occurrence in English Commerce.—In a former paper (see Proceedings, 1880, p. 121) Mr. E. M. Holmes had described a drug which, under the name of "Japanese belladonna root," was offered in English commerce, and which proved to be the root of

FIG. 37.



Root of Medicago sativa, with a, transverse section of it, and b, of belladonna root.

Scopolia japonica. He now has occasion to draw attention to the root of *Medicago sativa*, which Professor Flückiger had previously noticed as occurring on the European continent as an adulterant for belladonna root, and which has now found its way into England. In size and color the medicago root (see Fig. 37) resembles that of belladonna, but differs in the following particulars:

The crown of the root is divided into three or four woody branches, which are solid. The tap-root is hard and woody and broken only with difficulty. The outer surface is more or less covered with small scattered warts, and when scratched with the nail does not leave a white mark. The transverse section presents a woody structure, and when it is wetted the cortical portion is seen to be of a white color with a yellowish meditullium traversed by a number of white medullary rays (Fig. *a*). When the transverse surface of the root is moistened, a leguminous odor, somewhat resembling that of the pea, becomes perceptible, and the flavor is similar. The taste of the root is at first sweet like that of licorice, and afterwards bitter and somewhat acrid, irritating the fauces.

Belladonna root is generally crowned with the hollow bases of the leafy stems, and the epidermis is easily scratched off by the nail, leaving a white starchy spot wherever abraded. The transverse surface of the root exhibits a narrow cortical portion of a yellowish or pale-brown color, divided by a dark line from the large meditullium or central portion. The latter is also of a pale-brown color, and shows irregularly scattered through its substance, but more numerous towards the cortical portion, a number of darker dots (Fig. *b*), which when examined through a lens are seen to be vascular bundles, in which the openings of the large porous vessels are visible, the vessels being surrounded by a few wood-cells, which give the dark color to the dots. The taste of the root is starchy and slightly bitter, without subsequent acridity. The root breaks with ease. Both the medicago and the belladonna contain starch, the grains being much larger and more muller-shaped in belladonna, and forming sometimes duplex or triple granules; other granules appear circular or oblong oval, according to their position. In medicago the starch-grains are somewhat similar, but smaller. There are also present in the latter root a number of linear-oval grains, presenting a well-marked linear hilum. There is much less starch in the root than in belladonna, and the iodine test therefore gives a comparatively faint reaction. Neither root appears to contain tannin. The best marks by which to distinguish the medicago root, therefore, are the radiated structure of the meditullium, its woody character, and consequent resistance when an attempt is made to fracture it. The root is of German origin.—New Rem., May, 1882, p. 137; from Pharm. Jour. Trans., March 11th, 1882.

Henbane—Cultivation in Lincolnshire.—Mr. E. M. Holmes describes the cultivation of henbane at Market Deeping, where the soil seems well suited for it. As at Hitchin and elsewhere the crop is a very uncertain one. The autumn leaves of the first year's growth of the biennial plant are here never stripped off for sale, since doing so is found to lessen the vigor of the growth of the next year. The growth of the seed, which is sown in March, seems in some degree to depend upon the depth at which it is buried and the firmness of the soil. When the earth is in a powdery state and the seed not buried deeply germination takes place more quickly and certainly. Some of the seeds usually develop annual plants. The collection commences about the 6th of June and lasts till the middle of July, the flowering tops and leaves, deprived of the midrib, being alone used for drying. The drying is conducted in a perfect drying-closet, containing about 140 large sliding trays, the heat being furnished by pipes, through which steam passes, a draught of cold air entering at the base and the heated air escaping at the top. In this way the herb is speedily dried without access of light. The remaining portions of the plant, which consist of the stem and midrib of leaves, are submitted to hydraulic pressure, and the juice used in the preparation of extract, the yield being about 4½ lbs. per cwt.

Belladonna.—This, probably on account of the absence or small quantity of lime present in the soil, does not seem to flourish as well as the henbane. It is propagated by seed, which is taken out of the berries and washed and planted in the autumn. It comes up in the following spring, and when of sufficient size is pricked out. The following year it is fit for cutting, the first crop being collected in the beginning of July, and the second about the first week in September. The cultivation can rarely be continued beyond the third year in the same field, as the increased weight of the plant has a tendency to split the root, and water getting in rots it. As much of the root as is in good condition when the land is ploughed up is dried and sold.—Pharm. Jour. Trans., September 17, 1881, pp. 238, 239.

Tobacco—Estimation of Nicotine.—Dr. J. Skalweit, while making a large number of estimations of nicotine in tobacco, has carefully examined the various methods proposed. Schloesing's process yields unreliable results, owing to the difficulty of completely extracting tobacco with ether, and of exactly neutralizing the viscous resinous liquid with acid. Varying the apparatus by employing those recommended by Soxhlet and by Tollens for the extraction of fat, or the apparatus of Schiel, the results were not improved. If distillation in the presence of alkali and water be resorted to, a decomposition of the nicotine seems to be unavoidable. The author, therefore, converts the alkaloid into sulphate, and extracts this salt by 98 per cent. alcohol.

The tobacco is dried at 50° C., finely powdered, and the moisture estimated with a weighed sample, 20.25 grams of the powder are mixed with 10 c.c. normal sulphuric acid and 200 c.c. alcohol of 98 per cent. The mixture is boiled for two hours in a flask, connected with a reversed condenser, and when cool poured into a measuring flask of 250 c.c., the boiler being rinsed out with absolute alcohol sufficient for obtaining the measure indicated; 100 c.c. of the clear liquid are placed in a flask, provided with a funnel-tube terminating near the bottom in a fine point, and with a bent tube for carrying off the alcoholic vapors; the greater portion of the alcohol is distilled off, 30 c.c. of potassa solution, specific gravity 1.159, are added, and the distillation is continued until the liquid, dropping from the condenser, shows no reaction on litmus-paper. The distillate is titrated with tenth-normal sulphuric acid, and by dividing the cubic centimeters found with 5, the percentage of nicotine in the tobacco examined is ascertained. The absence of ammonium sulphate is proven by evaporating to dryness and dissolving in 98 per cent. alcohol.—Amer. Jour. Pharm., February, 1882, p. 60; from Archiv d. Phar., July, 1881, pp. 36–41.

Dr. Skalweit has since made comparative experiments with Schloesing's alkali-ether process and the sulphuric acid-alcohol process, with a view of arriving at a satisfactory conclusion on the following points:

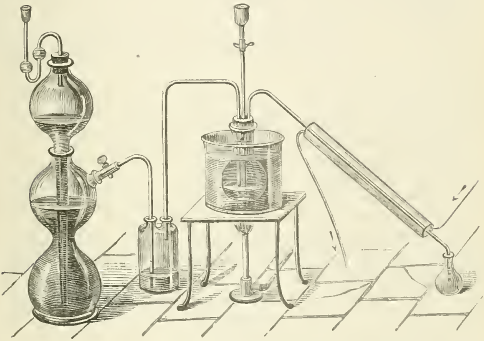
1. Is all the nicotine extracted from tobacco by sulphuric acid and alcohol?

2. Is any nicotine retained by the tobacco when treated with potassa-lye and ether?

His results are affirmative of the first question: the tobacco is completely extracted. As to the second question, however, he is not so certain. In some cases only traces of nicotine are retained by the tobacco, whilst in others the quantity retained was as much as ½ per cent., such being particularly the case in tobaccos containing but little juice, or which had been subjected to after-fermentation in Wenderott's apparatus. The analysis of tobacco is, therefore, more certainly correct, if the extract is made with alcohol and sulphuric acid, than when made with alkali and ether.

The author has slightly modified his process. A current of hydrogen is passed through the apparatus, not alone towards the end, but at the beginning of the distillation. Furthermore, he recommends that 5 c.c. of warm water be added 2 or 3 times through the funnel-tube as soon as the extract begins to get dry. The apparatus employed by the author is shown in the accompanying cut. (Fig. 38.) The funnel-tube, it will be observed, is provided with a clamp to shut off connection of the interior with the outer air when the extract in the flask is nearly dry. The distillate must be carefully tested for sulphate of ammonium, and, to secure accurate results, should be as concentrated as possible.—Archiv d. Phar., February, 1882, pp. 113–119.

FIG. 38.



Apparatus for preparing Nicotine.

Tobacco — Determination of Nicotine.—R. Kissling criticises the methods for the determination of nicotine hitherto in use, such as Schloesing's, Nessler's, Henry Boutron's, Wittstein's, Dragendorff's, Liecke's, etc., but particularly those of Schloesing and Dragendorff, with which he has made comparative experiments. The objection to the first is that ammonia may be calculated for nicotine, whilst the determination of Dragendorff by titration with iodohydrargyrate of potassium, notwithstanding its apparent simplicity, is impracticable.

The author has obtained very good results by the following method: The tobacco is stripped, cut, dried for 1 to 2 hours at 50° to 60°, and reduced to a coarse but uniform powder. 20 grams of this powder are carefully moistened with 10 c.c. of a dilute alcoholic solution of sodium hydrate (6 grams sodium hydrate. 40 c.c. of water, and 60 c.c. alcohol of 95 per cent.); the moist powder is enveloped in filter-paper, introduced into a Tollens extraction-tube, and extracted with 100 c.c. of ether for 2 or 3 hours. The ether is carefully and not quite completely distilled off, the residue mixed with 50 c.c. of dilute aqueous solution of sodium hydrate (4 : 1000) and subjected to distillation in a current of steam, the distillation being carried on as energetically as possible until 400 c.c. of distillate are obtained in 4 portions of 100 c.c. each, which are titrated with sulphuric acid, rosolic acid being used as indicator.

The results of a large number of nicotine determinations show the method to be reliable, and lead the author to the following conclusions:

1. The percentage of nicotine in many (probably all) kinds of tobacco fluctuate between very wide limits, so that the definite percentages of certain sorts of tobacco that are frequently given are entirely without value and can apply only to the sample tested.

2. The percentage of nicotine in a sort of tobacco does not alone vary according to the crop, but there are also very material differences found in the same crop, the same lot, and even in the same package.

3. In the case of fermented tobaccos a certain connection seems to exist between their richness in nicotine and in juice, those containing little juice containing relatively small quantities of nicotine, while the thick, juicy, so-called, fatty kinds, are rich in nicotine.—Archiv d. Pharm., March, 1882, p. 214; from Zeitschr. f. Anal. Chem., xxi, No. 1.

OLEACEÆ.

Fraxinus Americana—Presence of an Alkaloid in the Bark.—Prof. F. B. Power, in connection with Mr. H. M. Edwards, has noticed the presence of an alkaloid in the bark of the White Ash. The body in question is apparently quite a strong base, and is, with a considerable degree of probability, the principle upon which the therapeutical virtues of the bark depend. Prof. Power will continue his researches,—embodying the isolation of the alkaloid, its description, composition, and properties,—and will report on the same at the earliest possible date.—Am. Jour. Phar., March, 1882, p. 99.

Fraxinus Americana—Characters of the Bark and Proximate Constituents.—In connection with the above, the following will be of interest: The White or American Ash grows from Nova Scotia and New Brunswick to the western shores of Lake Superior, southward to Florida and Louisiana, and westward to Eastern Nebraska and Kansas. The bark is collected from the trunk and root, the latter being preferred. As seen in commerce it is usually in pieces varying from three to six millimeters in thickness, from twenty-five to seventy-five millimeters in width, and sometimes fifteen centimeters in length. The suberous tissue being generally removed from the old bark, this is externally whitish or grayish-yellow, sometimes reddish or brown-red, frequently with irregular longitudinal ridges and warts from adhering cork; internally it is yellow and smooth. Its transverse fracture is very fibrous, its odor is slightly aromatic, and its taste bitter and slightly acrid.

Mr. John M. Bradford obtained by distillation with water a minute quantity of volatile oil, and a white substance subsiding in the distillate. The bark was also found to contain a neutral resin, fatty matter, starch, gum, tannin, and a bitter principle, and yielded to different menstrua the percentage of extract below mentioned:

1.	Menstruum,	strong alcohol,			yield	22.4	per cent.	extract.
2.	"	alcohol 4 parts,	water 1 part,		"	26.2	"	"
3.	"	" 4 "	" 2 "		"	28.2	"	"
4.	"	" 4 "	" 3 "		"	29.0	"	"
5.	"	" 4 "	" 4 "		"	31.6	"	"
6.	"	" 3 "	" 4 "		"	31.6	"	"
7.	"	" 2 "	" 4 "		"	31.6	"	"
8.	"	" 1 "	" 4 "		"	31.8	"	"
9.	"	water (percolate turbid)			"	28.8	"	"

All of these extracts had a bitter taste, and the alcoholic ones were soluble in water. Mr. Howard M. Edwards obtained, besides small quantities of the alkaloid above mentioned, also volatile oil (which was bland and aromatic) and starch, together with sugar; but he found neither tannic nor gallic acid, and attributes the blue-black color produced by ferric chloride to coloring matter and resin. Bradford had, however, obtained a precipitate with gelatin. Mr. Edwards describes the tincture, fluid extract, and extract prepared from the bark, which see under their respective headings under "Pharmacy."

Olives—Cultivation in California.—The olive tree was first planted in California in 1769 by the Spanish missionaries at San Diego, the variety being probably a wild one, as its fruit is smaller and not so abundant as the French and Italian varieties. Jerome J. B. Argenti, in a thesis to the California College of Pharmacy, states that the olive is now extensively cultivated in the southern and central portions of that State for the manufacture of the oil. From the comparison of meteorological tables the author finds the climate of Colfax to be similar to that of Rome, Sacramento to Naples, Los Angeles to Alexandria, Chico to Jerusalem, and thinks that the olive may be still more extensively grown in California. The tree thrives best in a dry calcareous and sandy soil, and can be propagated by seeds, slips, cuttings, suckers, and from the small swellings or knots called *novoli* by the Italians. When the seed is used, the pulp of the fruit is removed, the stone is soaked in strong lye to soften it, and is then planted and occasionally watered, the seedling being transplanted when two or three years old.—Am. Jour. Phar., April, 1882, p. 178.

Olive Culture in Australia.—At a meeting of the Royal Agricultural Society, Adelaide, a discussion took place on the culture of the olive in Australia, from which it appears that this can be made a profitable industry. The following returns of the produce on the place of Mr. S. Davenport exhibits some interesting figures :

YEAR.	Weight of olives—crushed.			Oil per cwt.			Total oil.	Per cent. for weight.
	cwt.	qr.	lb.	gals.	qts.	pts.	gals.	
1875,	139	3	19	1	1	1.28	203	11.79
1876,	146	3	6	1	2	1.20	242	13.40
1877,	336	1	5	1	3	0.96	435	14.83
1878,	68	1	24	2	0	1.60	150	17.80
1879,	236	0	18	1	2	0.40	521	12.59
1880,	290	1	22	1	3	0.88	512	14.32
1881,	239	0	14	1	2	1.04	389	13.21

Mr. Davenport draws attention to the year 1878, when there was a very hot season, and the yield of olives was consequently small, while, on the other hand, the percentage of oil was very much larger than during previous years. It should be remembered that the olive is a plant which becomes more valuable each year, as the yield becomes larger and larger. The olive is suited to a dry climate, and is therefore very valuable to a country like Australia. With regard to the picking, Mr. Davenport points out that the best table oil is produced from olives hand-picked. If they are allowed to lie on the ground, the oil is not of the best quality, on account of the berry becoming impregnated with any smell that may be in the ground.—Oil and Drug News, January 31, 1882, p. 11.

Jasminum Betchei—A New Jasmine from Samoa.—Ferd. Von Mueller describes a new jasmine from Samoa, which he regards as having not merely horticultural value, but also for perfumery purposes. He gives the following diagnostic: Tall-climbing, glabrous; leaves opposite, unifoliolate; leaf-stalks, together with their stalklets, rather short; leaflets large, roundish-ovate, acutely narrowed at the summit, of chartaceous consistence, three-nerved towards the base, thinly and distantly veined; peduncles mostly axillary, bearing 1 to 3 flowers on long pedicels; teeth of the calyx 4 to 5, deltoid, minutely pointed, much shorter than the tube; corolla very long, pure white, divided not much beyond the middle into 6 to 10 lanceolate-linear gradually acuminated lobes, its tube narrow, only slightly widened upwards; anthers elongated, linear-cylindrical, short-pointed, on very thin filaments near or above the middle of the tube; style deeply inclosed; fruit-calyx not angular; fruitlets very large, 1 to 3 seeded; pericarp coriaceous, outside nearly black. On the edges of the forests in the lower mountain region of Apia—only once found.—Am. Jour. Phar., February, 1882, p. 73, from Chem. and Drug., Austral. Suppl., August, 1881, p. 29.

LABIATÆ.

Peppermint—Cultivation in the United States.—The peppermint crop of the United States has, for the last few years, reached the amount of 70,000 pounds per year, of which about 30,000 pounds were annually exported. Two-thirds of the peppermint oil of this country is produced in New York State, and about one-third in Michigan. The best oil comes from Wayne County, New York. The plant is a perennial one, and is planted in the spring. The next year it is ready for cutting, and generally may be cut for three years.

The best yield is given in the first and second year of cutting; in the third year the plant becomes bitter. After the plant becomes four years old it is not cut, and the field is ploughed over and a new crop planted. The usual method of planting is in rows, and in August the plant is ready for cutting, which is done by mowing down with a scythe. The leaves are then placed in a still and the oil extracted. There was a report that considerable of the roots were damaged by the cold weather of last winter, but it is claimed that this will not affect the price, as there is an increased acreage, and the damage is not as great as has been claimed. The plant is a very hardy one, and will yield from 10 to 30 pounds to the acre. The cultivation of the peppermint is now being introduced into the Southern States, where it will furnish a profitable crop in the middle of the year, but as yet none of the Southern oil has reached this market.—New Rem., September, 1881, p. 288; from Boston Bulletin.

Peppermint—Cultivation in Lincolnshire.—According to Mr. E. M. Holmes the variety grown in the neighborhood of Market Deeping is the black peppermint, about 100 to 200 acres being under cultivation. The plant is propagated by suckers. As soon as the young shoots from the last year's crop have attained a height of about 4 inches, they are pulled out and transplanted into new soil. These grow vigorously the first year, and throw out numerous stolons above the surface of the ground; hence, in the autumn, the first crop has always to be cut by hand with a sickle, to prevent injury to the stolons. After the crop has been removed, these are allowed to harden, or become woody, and then farmyard manure is scattered over the field and ploughed in. In this way the stolons are divided into numerous portions and covered with soil. If the autumn proves wet, the stolons do not harden, but become sodden and rot, and a failure is the result; but if the weather be favorable, and the plants retain their vitality, the field is top-dressed in the spring with Peruvian guano. In fresh ground the peppermint requires hand weeding two or three times, as the hoe cannot be used without injury to the roots and stolons of the plants. If the field has been previously used for the cultivation of other aromatic herbs, scattered plants of such must be removed before distilling the oil. Moist heavy weather in August is apt to cause rust to make its appearance; the leaves drop off and leave the stem almost bare. To prevent this to a great extent, the excessive moisture is removed from the plants by running a rope over them, one man walking along one furrow, and another along the nearest one. The herb of the second and third year (for the same plants rarely yield a fourth crop on the same land) is cut with scythes. The gathering commences about the beginning of August and lasts for six weeks, the stills being kept at work day and night. These are of copper, about 7 or 8 feet high, and 5 feet in diameter, and holding about 5 cwts. of herb. A perforated false bottom, provided with a large hook in the centre for the withdrawal of the entire charge of herb by means of a windlass, rests in the still about 2 feet from the bottom, and enough water is poured in to cover the false bottom about 2 feet. The still is then filled with the herb, which is trodden in by men; the lid, fitting into a water-joint, is fastened down by two transverse bars, and the distillation is then started by direct heat, requiring about four and one-half hours. The yield of oil varies according to the weather, from 1 pound 12 ounces to 5 pounds per still, and being best when the summer has been dry.—Pharm. Jour. Trans., September 17th, 1881, p. 237.

Chia Seed—Characters and Remedial Value.—Mr. Hiland Flowers draws attention to the seeds of

Salvia Hispanica (or Salvia Chian), a plant which grows in the Northern States of Mexico. These seeds, which abound in mucilage and a fixed oil, similar to flaxseed, are highly valued for the preparation of a refreshing drink for the sick, which is prepared by adding a tablespoonful of the seed to a tumblerful of cold water, allowing it to steep for half an hour, and, generally, sweetening and flavoring it with orange-flower water. This drink is found very efficient in fevers when great thirst usually troubles the invalid. As a demulcent and emollient it is superior to flaxseed. The mucilage is often used with advantage as a vehicle for mild injection in the earlier stages of venereal diseases, and is very useful in throat affections as a gargle and wash.

The seed is a small one, about $\frac{1}{16}$ inch in length and $\frac{1}{24}$ inch in width; oblong-ovate, somewhat flattish, nearly cylindrical, both ends rounded and slightly tapering; the thinner end has a small, dark line, forming a slight projection, which is the eye of the seed, and this, when exposed to moisture, opens in a star-shaped or scalloped manner, emitting the growing embryo; below this eye are oil-cells. The seed is smooth and glossy, and is surrounded by a transparent epithelium, swelling very largely when in water. The testa is darkish-gray, striated with dark-brown lines, running diagonally, and dotted, forming a very beautiful variegated surface; when pressed or crushed under a spatula it bursts at the hilum, exposing the cotyledons and the oil-cells, leaving an oily stain upon paper. Internally the testa is dark, grayish-brown, perfectly smooth, glossy, and devoid of the external variegations or stria. It contains the embryo, with the radicle pointing towards the hilum, and a white, mucilaginous substance, much resembling unrendered fat. When immersed in water the seeds very readily yield their mucilage to it, and swell to about twice their natural size; they are inodorous when whole, but when crushed have an oily odor similar to that of ground flaxseed.—Amer. Jour. Pharm., May, 1882, pp. 227–229.

Chia—Allied Species of Salvia.—Prof. J. M. Maisch, referring to the above, gives some additional information both as to the species of salvia yielding the above seed, and other species that are, or have been, known as chia-seed. Among others, he draws attention particularly to

Salvia Columbariæ, Benth., which, according to Dr. Edward Palmer (see Proceedings, 1879, p. 163), is the "Chia of the Mexicans and Indians of Arizona and New Mexico." The interesting account by Dr. J. T. Rothrock, of the same species, which confirms the observations of Dr. Palmer, is quoted by the author from "Report upon United States Geographical Surveys west of the one-hundredth Meridian," vol. vi. p. 48. Other species, such as *Salvia verticillata*, Willd., *Salvia verbenaca*, Lin., *S. hominum*, Lin., *S. viridis*, Lin., all indigenous to Central or Southern Europe, are noted for the mucilaginous character of their seeds, and have on this account been employed to remove foreign substances from the eye, just as linseed is used with us. Another species,

Salvia urticifolia, Lin., indigenous to Southern United States, may probably deserve attention for the same purposes as the above, and, inasmuch as there are over 400 species of salvia known, mostly indigenous to the warm temperate zone, and to subtropical and tropical countries, it is not unlikely that many of these will prove more or less substitutes for those that for various causes have become better known in the past.

Guibourt, in "Histoire naturelle des drogues simples" (4 edit. II. p. 432), describes *Chia* seed and the plant grown from it at the École de Pharmacie, and subsequently (1866) refers the seed positively to

Salvia Hispanica.—From this description, however, the plant cannot be identical with *Salvia hispanica*, which is an annual, and grows wild in Spain as well as in other parts of Southern Europe, in Jamaica, Mexico, and tropical America. Indeed the plant, under the name

Salvia Chian, La Llare, is quoted in the "Farmacopea Mexicana," as a new species.

Prof. Maisch concludes that at least several species of salvia have fruits resembling in appearance very small ricinus seeds, and that most likely such of them which are mucilaginous have been used by the aborigines under the name of *chia*, which would, therefore, have to be regarded as a generic name, applicable to all fruits of salvias having the characters indicated.—Ibid., pp. 229–234.

Prof. Maisch, in continuance of the above subject, draws attention to a paper in a Mexican journal "La Naturaleza," for 1881, in which Mr. Mariano Báseena states that *Chia azul* is probably a variety of *Salvia patens*, Cav., which flowers in June, July and August, while the more common *Chia* is

Salvia polystachya, Ort, which is in bloom from June to October. The description of the latter species, by De Candolle, agrees better with the description of Guibourt's plant, than does either *S. hispanica* or *S. columbariæ*.—Ibid., p. 261.

CONVOLVULACEÆ.

Scammony—Percentage of Resin.—Mr. William A. Wrenn, in connection with a paper giving general information on the subject of scammony, its collection, characters, etc., communicates the following percentage of resin, soluble in ether, obtained by him from different commercial samples. Four samples of "Virgin" scammony yielded 87.4, 76.2, 59.5, and 65.6 per cent., and four samples of "Aleppo" scammony yielded 41.6, 55.5, 48.4, and 54.5 per cent. of resin respectively. A sample of "Skillip" scammony—so-called after the name of a town ("Iskillip") near Angora—contained 18 per cent. of scammony resin, and was adulterated to the extent of 15 per cent. with jalap resin. A second sample of "Skillip" scammony was a very bad imitation, which had the smell peculiar to india-rubber, hard and heavy, and without any holes, which are found in most samples of scammony, and are due, probably, to fermentation. It contained 25 per cent. of gum, 10 per cent. of resin, soluble in ether, and 20 per cent. of common resin.

Mr. Wrenn also examined a commercial sample of "scammony resin," and found 91.5 per cent. of it to be soluble in ether, 6 per cent. soluble in alcohol, the remaining 2.5 per cent. being soluble in water. "Scammony root" yielded to alcohol, after exhaustion with water, from 6 to 9 per cent. of resin which was wholly soluble in ether (sp. gr., 0.735), the smaller proportion being obtained from the lower part of the root, and the larger percentage from the upper. As to the identity of the resin of scammony from the gum-resin with that prepared from the root, the author has little or no doubt. Reagents reveal no difference whatever.—Chem. and Drug., January, 1882, pp. 12–13.

Jamaica Jalap—Chemical Examination.—Mr. D. Morris, director of the Botanical Gardens, Jamaica, sent to Mr. Holmes two samples of the officinal jalap, *Exogonium purga*, cultivated in that island. The one consisted of small whole tubers, the other of slices of larger tubers. Both were subjected to chemical examination by Mr. Thomas Greenish, who found the whole tubers to contain 7.55 per cent. of resin and 17.3 per cent. of moisture, and the slices 8.17 per cent. of resin and 14.1 per cent. of moisture. As a result of these analyses it would appear that Jamaica-grown jalap yields considerably less resin than the average of good Mexican jalap (12–18 per cent.), and that the samples approach more nearly that grown in the Botanic Gardens, Trinity College, Dublin, which yielded 9.2–11.97 per cent. of resin. In his letter accompanying the above samples Mr. Morris states that it was impossible to dry the tubers whole or gashed without artificial heat, but that sliced tubers can be dried without artificial heat, and thus save nearly 2*d*. per pound on the cost of production. He found the tubers to lose over 70 per cent. in drying.—Yearbook of Phar., 1881, pp. 444–446.

Jalap—Percentage of Resin.—Mr. William A. Wrenn obtained from very heavy pieces of "Vera Cruz" jalap 16.5 per cent., and from a second sample, taken indiscriminately from the bale, 11 per cent. of resin. The powder was first exhausted with hot water, allowed to dry, and then exhausted with alcohol. Some resin was also prepared from "Tampico" jalap, and the three, numbered in the order stated, subjected to examination, with the following results: No. 1, soluble in ether, 3.5 per cent.; soluble in alcohol, 93.5 per cent. No. 2, soluble in ether, 4.2 per cent.; soluble in alcohol, 91.8 per cent. No. 3, soluble in ether, 36.5 per cent.; soluble in alcohol, 45.2.—Chem. and Drug., January, 1882, p. 13.

Factitious Jalap.—Dr. Edward R. Squibb recently received several samples of what was offered for entry at the (New York) custom-house as jalap. The substance had somewhat the appearance of jalap, and was evidently prepared with some pains and care to imitate the drug. On closer examination, however, the larger pieces were found to be a dried and compressed saccharine fruit. Other pieces were roots, having the appearance of false jalap, but not a single tuber or part of a tuber of true jalap could be found in any of the samples.—Ephemeris, No. 3, 1882, p. 86.

Ipomœa Pandurata—Proximate Examination.—Mr. Constanz Manz has subjected the root of the wild jalap (syn., man-root, man-of-the-earth, wild potato) to proximate examination, and has determined, besides a coloring body (giving a greenish-blue coloration with ferric chloride, but no precipitate with gelatin), sugar, and starch, two resins, both of which are glucosides. The one appears to be brittle and acid in its characters, soluble in alcohol, ether, chloroform, methylic alcohol, and hydrate of potassium, insoluble in benzol, benzin, acetic acid, and turpentine; the other is soft, neutral, and has similar solubilities to the first-named, except that it is insoluble in methylic alcohol. The mixture of the two resins has cathartic properties.—Amer. Jour. Phar., August, 1881, p. 385–387.

BIGNONIACEÆ.

Jacaranda procera, Sprengel; s. Bignonia Copaia, *Aubl.;* s. Kordelestris syphilitica. *Arruel;* s. Bignonia Càroba, *Vellos.* This handsome little tree is known in Brazil as caroba, carobinha, caroba miuda, and caroba mirim, and grows frequently in the provinces of Rio de Janeiro, Minas, and Espirito Santo. Th. Peckolt has examined both the leaves and bark, with the following results, obtained from 1000 grams:

	Leaves.	Bark.
Carobin, crystallized,	1.620	3.000
Carobic acid, crystallized,	.516	....
Steocarobic acid, crystallized,	1 000	....
Carobone, balsamic resinous acid,	26.666	....
Carobaretic acid, inodorous,	....	2.000
Carobaresin, inodorous, tasteless,	33 334	5.000
Caroba balsam,	14.420	....
Bitter principle,	2.880	2.830
Extractive,	10.550	19.530
Extractive and organic acids,	10.000	....
Caroba tannin,	4.390	4.800
Glucose,	....	1.650
Chlorophyll and wax,	9.000	....
Calcium malate,	.200	76.100
Albumen, starch, dextrin, salts,	32.120	
Cellulose and moisture,	853.304	885.090

Carobin crystallizes in feltlike silky needles, is inodorous, has a faint alkaline and bitterish taste, infusible, insoluble in ether, readily soluble in boiling water and boiling alcohol, and is precipitated by tartar emetic and ammonium carbonate, the latter precipitate being soluble in an excess of the reagent. Tannin and metallic chlorides and iodides cause no precipitate. It is not a glucoside, does not show any striking color reactions, and yields with acetic acid a compound crystallizing in fine needles.

Carobic acid forms stellate fusible needles, of an aromatic odor and acid taste, is soluble in water and dilute alcohol, and is precipitated by the acetates of lead and copper.

Steocarobic acid is pale-brown, of a tonka-like odor, of an acid and balsamic taste, and soluble in cold absolute alcohol and ether.

Carobone is greenish, amorphous, aromatic, soluble in alcohol, sp. gr. .815, in caustic alkalies and in boiling solution of sodium carbonate.

Caroba balsam is dark-brown, syrupy, agreeably aromatic, resembling tonka, and by heat may be evaporated to a nearly inodorous resin.

Caroba leaves have lanceolate, often sub-obovate leaflets, and are used in Brazil in place of sarsaparilla, in cutaneous affections and as an antisyphilitic, usually in the form of infusion, 120 grams to 1 liter, in doses of a teaspoonful three times daily. An *electuary* known as "massa de Dr. Alves-Carneiro" is composed of the powders of caroba leaves 90 grams, sarsaparilla and senna each 30 grams, calomel 2 grams, and simple syrup q. s., and is given in cutaneous syphilitic affections in doses of a teaspoonful morning and evening, together with caroba tea.

The above analysis was completed in 1866; a manuscript in French sent to the Paris Exposition was never published; but a catalogue was published by the author in Rio in the Portuguese language in 1868. An analysis credited to C. W. Zaremba in "Phar. Centralhalle," June 23d, 1881, gives figures identical with the above.

The following plants are also known in Brazil as caroba:

Jacaranda Subrhombea, *D. C.*, s. Bignonia obovata, *Vellos.*, caroba preta or carob-assú; a furrowed crisp dark-green leaf, not aromatic, apparently less efficacious.

Bignonia Nodosa, *Manso*, caroba do campo, slightly aromatic, grows in the prairies, esteemed to be equal to true caroba.

Jacaranda Oxyphylla, *Cham.*, s. Big. antisyphilitica, *Martius*, caroba des paulistas; leaflets dark-green, nearly inodorous, reputed to be also laxative; grows in the province of San Paulo.

Bignonia Purgans, caroba guyra, in Amazonas; leaves used as an antisyphilitic, the root-bark as a purgative.

Sparattosperma Lithontripticum, *Mart.*, caroba branca; leaves light-green, mealy, aromatic, acrid and bitter; diuretic.

Cybistax Antisyphilitica, *Mart.*, s. Big. quinquefolia, *Vellos.*; used in dysury, dropsy, chronic liver complaints, syphilitic ulcers, etc.—Am. Jour. Phar., March, 1882, p. 134; from Zeitsch. Oest. Apoth. Ver., 1881, No. 30, 31.

Sesamum Orientale—Uses of the Seeds in Greece.—According to Prof. X. Landerer the Lenten food of Orientals, salled chalba, or chalwa, is prepared from the seeds of the white sesame. Many thousands of wooden chests of this chalwa are sent to Athens from Syra, where great manufactories have been established. Bakers bestrew bread with the seeds, and when beaten with a few almonds and a little sugar and water, the white sesame forms an agreeable sumada, or emulsion, called sesame and almond milk.—Chem. and Drug., July, 1881, p. 293.

GENTIANACEÆ.

Gentiana Lutea.—Isolation and character of a peculiar sugar (Gentianose) from the root. See *Carbohydrates*, under "Organic Chemistry."

Spigelia Marilandica.—Presence of a volatile alkaloid "*Spigeline*," which see under "Organic Chemistry."

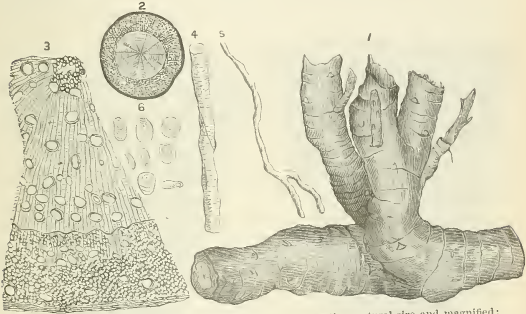
ASCLEPIADACEÆ.

Asclepias Tuberosa—Proximate Examination.—Mr. Alton Clabaugh has made a proximate examination of "the drug," by which he evidently means the root. He finds it to yield by distillation with water a small quantity of volatile oil and some stearoptene, the latter being crystallizable in prismatic needles, and melting in water heated to 106° F. A saponifiable fixed oil, some starch and gum, were also determined. The other substances, among which were some of resinous nature, are not well determined. The drug yields on incineration 5.4 per cent. ash, of which 21.5 per cent. is soluble in water.—Am. Jour. Phar., Jan., 1882, p. 5.

Asclepias Cornuti, Decaisne—Characters of the Rhizome and Constituents.—Mr. Walter L. Hinchman gives the following description of the rhizome of this plant: It is long and comparatively slender, reaching from one to six feet in length, from one-half to one inch in diameter, and runs horizontally about six inches below the surface of the ground. It is thickened at intervals of ten or twelve inches, where the overground stems shoot out, otherwise it is uniform in size and at the end has generally three rootlets. It has a thick bark, externally brown, the interior white, and contains a number of laticiferous ducts, somewhat scattered, but principally placed in two irregular lines. In drying the bark shrinks very much and is finely wrinkled longitudinally, and somewhat fissured at intervals, leaving the wood exposed. The wood, of a yellow color, is hard and brittle, breaking with a resinous fracture; it contains a large number of medullary rays and also ducts, which are visible to the naked eye. In the accompanying cut (Fig. 39), 1, shows a portion of the rhizome; 2, a transverse section of the same, natural size; 3, a transverse section, magnified; 4, bast fibres; 5, laticiferous vessels; 6, starch-granules.

The fresh rhizome in air-drying loses 70 per cent., the air dry in complete drying 10 per cent., and when completely dried yields 6 per cent. of ash. Proximate analysis revealed the presence of asclepion, caoutchouc, fixed oil, tannin, glucose, a bitter principle, gum, starch, and volatile oil.—Am. Jour. Phar., September, 1881, pp. 433–435.

FIG. 39.

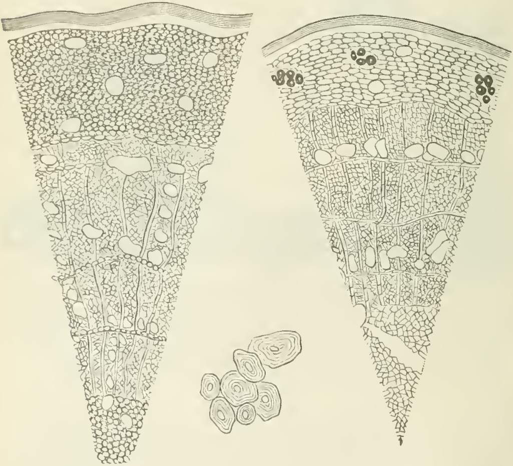


Asclepias cornuti: 1. Portion of rhizome; 2, 3. Transverse section, natural size and magnified; 4. Bast fibre; 5. Laticiferous vessel; 6. Starch-granules.

APOCYNACEÆ.

Apocynum Androsæmifolium and A. Cannabinum—Microscopic Structure.—Mr. E. A. Manheimer, in view of the close botanical relations of the two plants, and the fact that the drug furnished in the market as *A. Androsæmifolium* is, in his experience, invariably a substitute, identified to be either the root of a cannabinum or of a closely allied species, has subjected authentic specimens of the two roots to microscopic examination, transverse sections of them being shown in the accompanying cut (Fig. 40), that on the right being *A. Androsæmifolium.* This, under the microscope, shows in the pith a few vessels and much starch; the cells are largest near the centre, and are more or less compressed towards the wood, which is traversed by many medullary rays, and contains, chiefly in the outer portion, a number of vessels. The bark is composed of oblong cells, differing in size and containing starch; a few laticiferous vessels are seen, and several groups of thick-walled bast-cells, arranged somewhat in a circle near the middle of the bark. These are shown enlarged in the cut. The root of *A. cannabinum* shows, in the transverse section, in the centre a few small round cells. Then follows the wood, showing about three annular layers, vessels somewhat arranged in rows, and many medullary rays running into the bark. The cells of the bark are roundish, contain an abundance of starch, and also numerous laticiferous vessels. —Am. Jour. Phar., November, 1881, pp. 554–556.

Fig. 40.



Apocynum Cannabinum. Bast-cells. Apocynum Androsæmifolium.

Nux Vomica—Extraction of Fat.—The statement of Mr. Hallberg in his paper on "Powdered Extracts" (Proceedings, 1881, pp. 424–429), that the "benzin" extraction of nux vomica consisted of a light greenish-yellow fixed oil, which did not show any presence of alkaloids, being contrary to his own experience as well as that of Mr. C. Bullock (see Proceedings, 1875, p. 60) and of Mr. L. Wolff (see Proceedings, 1877, p. 72), Mr. T. Edward Greenish has made some experiments which prove that when powdered nux vomica is extracted by petroleum spirit (sp. gr. 700) the resulting oily extract contains a portion of strychnia and brucia. In the experiment described the amount of the alkaloids so extracted constituted one-sixth of the total amount of alkaloids contained in the drug. He found, furthermore, that after all the oil had been extracted, the nux vomica continued to yield its alkaloids to petroleum spirit. On the other hand, he finds that percolation with coal tar benzol extracts no alkaloid. From these observations it results that, when preparing the dry extract, care must be taken to remove the alkaloids from the petroleum spirit solution, either by shaking it with acidulated water and precipitating the alkaloids, or, as recommended by Mr. Wolff, to remove them by dilute alcohol.—Phar. Jour. Trans., January 14th, 1882, p. 581.

Strychnos Ignatii—Historical and Microscopical Notes.—Professor Flückiger and Arthur Meyer have communicated (to Phar. Jour. Trans., July 2d, 1881, pp. 1–6) some highly interesting notes on the fruit of *Strychnos Ignatii.* The authors have been enabled to examine some well-preserved fruits from Manilla, and give a very complete microscopic description of the same. This shows a very close structural analogy between the seeds of *Strychnos Ignatii* and *Strychnos Nux Vomica*, as well as the seeds of another species of *Strychnos* (probably *S. innocua*) from Eastern Africa, and of *Strychnos potatorum.* The paper is accompanied by 17 illustrations, and does not admit of condensation.

Wrightia Antidysenterica—Medicinal Value.—Kanny Loll Dey, Rai Bahadoor, draws attention to the value of the root-bark of *Wrightia Antidysenterica*, the conessi bark of Materia Medica. It is considered a specific medicine in dysentery and other bowel complaints, and has, in the author's experience, been used with such success that, in his opinion, its introduction into the (British) Pharmacopœia merits consideration. It is also a good tonic, and has been employed as a febrifuge. In the treatment of dysentery, a decoction is made by boiling 4 ounces of the root-bark with a pint of water to one-half, and giving 1 ounce or 2 ounce doses. The small shrub grows wild in the hilly districts of the Concan, the Ghants, and some other parts of India. The seeds are used for their vermifuge properties, and are generally administered by native physicians in combination with other drugs of a similar nature. When used separately they have also been found to succeed well.—Phar. Jour. Trans., September 24th, 1881, p. 257.

Wrightia Antidysenterica—Active Constituent.—In a former paper Dr. C. J. H. Warden had recorded the fact that Baboo Ram Chandra Dutta, Second Assistant in the Laboratory of the Calcutta Medical

College, had, without a previous knowledge of its existence, separated the active principle "kurchicene" (named by Stenhouse "conessine") from kurchi bark. Dr. Warden now draws attention to the difficulty of obtaining this alkaloid in the pure state, and gives the results of experiments made by his above-named assistant and Dr. J. M. Coates, which show that an acetic solution of the crude alkaloid will replace the pure substance in medicinal effects.—Chem. News, January 13th, 1882, p. 14.

Thevetia Nereifolia, Juss.—*Use for Homicidal Purposes in India.*—Mr. Kanny Loll Dey draws attention to this West Indian shrub, which has become domesticated in India, and is cultivated under the name of the Exile or Yellow Oleander. This shrub grows wild, but is also cultivated for the beauty of its flowers. The acrid oil of the kernels is a powerful acro-narcotic poison, allied to nux vomica, and its effects as a poison are very rapid. Lately, in Bengal, it has come to the author's notice that it is employed for homicidal purposes without raising any suspicion. An emulsion made with water and milk, sugared, will keep the appearance of milk without much affecting its taste; the slight bitterness is hidden by the sugar. At the present date no corroborative test is known for its detection.—Pharm. Jour. Trans., November 12th, 1881, p. 397.

Thevetia Nereifolia—Constituents.—Referring to the statement in the above paper, "that the acrid oil contained in the kernels is a powerful acro-narcotic poison," Dr. J. E. De Vrij remarks that many years ago, during his residence in Java, he had made some experiments which led him to a somewhat different conclusion. He had found the seeds to contain the glucoside "thevetin," which was subsequently subjected to nearer investigation* by Professor Blas. It was present in the white kernels to the amount of 4 per cent., and was obtained in beautiful white crystals. The white kernel constituted about 11.8 per cent. of the dry seeds, and yielded by expression from 35.5 to 41 per cent. of a perfectly limpid, almost colorless fixed oil, having a *very agreeable mild taste* equal to that of *fresh* oil of almonds. Its specific gravity at 25° C. was 0.9148, and it is solid at 13° C. It was examined by Professor A. C. Oudemons, who found it to consist of 63 per cent. of triolein and 37 per cent. of tripalmitin and tristearin. The bark of the shrub was also found to contain thevetin, but it was very difficult to extract it in the pure state. Regarding the poisonous properties of thevetin, Dr. De Vrij had made only one experiment with a middle-sized dog, to whom one decigram was administered, but without apparent effect. Dr. Dumontier, however, published an account of the poisoning of a mulatto child, three years of age, who had eaten one seed of thevetia. This child died with symptoms of tetanus.—Pharm. Jour. Trans., December 3, 1881, p. 457.

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* Dr. De Vrij, being unable to finish his investigation while in Java, gave 23.6 grams of the pure thevetin to Professor H. Will, at Giessen, in whose laboratory Dr. Blas continued and terminated the investigation begun by Dr. De Vrij.

Thevetia Nereifolia—Isolation of a Blue Coloring Matter from the Kernels.—Professor C. J. H. Warden, of Calcutta, while investigating the properties of the kernels of *Thevetia nereifolia* fruit, discovered a bright-blue coloring matter, which he names "*thevetin* blue." He has digested a quantity of the kernels, from which the oil had been removed with rectified spirits, in a stoppered bottle on the water-bath, near a capsule containing hydrochloric acid, when it was observed that the mouth of the bottle had acquired a bright-blue coloration. On treating a small quantity of the tincture with the same acid, a deep-blue coloration was almost immediately developed. He finds that thevetin blue is produced by the action of the hydrochloric acid upon a peculiar amorphous yellow substance, "*pseudo-indican*," which after much difficulty he succeeded in isolating in a pure state. It is a bright yellow, transparent, readily pulverizable, hygroscopic solid, easily soluble in water, alcohol, and methylic and amylic alcohols. Its reaction in aqueous solution is neutral; the taste unpleasant, but free from bitterness or acidity (acridity? Rep.). With aqueous solutions, concentrated hydrochloric acid induces an almost immediate bright-blue coloration, but the dilute acid produced no change upon the pseudo-indican until after the application of heat, when "thevetin blue" precipitates in flocks, and glucose is found in the colorless filtrate.

Thevetin blue on drying appears as a dark brownish or black amorphous powder, insoluble in water. It forms a dirty-brown solution with strong sulphuric acid; a bluish-green solution with concentrated hydrochloric acid; and reddish-brown solutions with glacial acetic acid, caustic alkaline solutions, and alcohol, strong or dilute, and in methylic alcohol. It is insoluble in ether, turpentine, carbon disulphide, or chloroform, and is only slightly dissolved by amylic alcohol or benzol. Thevetin blue appears to have certain points of resemblance to the cotton-seed blue, isolated by Dr. Kuhlman, but is shown by Professor Warden to be distinct. Pseudo-indican is also found to be largely present in the juice of the fruit, and in the bark; in the leaves it occurs to a small extent. The peculiar blue coloration being so readily developed—simple application of concentrated hydrochloric acid to the bruised kernels or bark sufficing—the author considers the reaction applicable to the detection of the poison in forensic examinations.—Pharm. Jour. Trans., November 19th, 1881, pp. 417, 418.

Thevetia Nereifolia—Further Researches.—Mr. C. J. H. Warden, in continuation of his investigation above noted, has succeeded in isolating the glucoside—evidently that referred to by Dr. De Vrij—which he describes as a white crystalline substance, slightly bitter, with a faint metallic taste, rapidly followed by a pricking and numbing effect on the tongue. A centigram injected into the stomach of a cat produced no apparent effects; a decigram dose, however, was fatal in twenty-five minutes, death being preceded by most violent convulsions. The percentage composition obtained by the author differs somewhat from that obtained by Blas, who assigned to it the formula $C_{108}H_{84}O_{48}$. Professor Warden had not been acquainted with the fact that the glucoside had been previously isolated and examined.—Chem. News, January 13th, 1882, p. 13.

Quebracho Blanco and Quebracho Colorado—Investigation.—Dr. O. Hesse has subjected the Argentine drugs known as quebracho blanco and quebracho colorado to proximate examination, and communicates his results to Annal. d. Chemie, ccxi, p. 249. The former is referred to *Aspidosperma Quebracho*, whilst the latter is, by Griesebach referred to *Loxopterygium Lorentzii.* The author has isolated and describes the following alkaloidal principles from the white quebracho: *aspidospermine*, *aspidospermatine*, *aspidosamine*, *hypoquebrachine*, *quebrachine*, and *quebrachamine*, all of which are active substances, resembling in their physiological action the *strychnos* bases, though less powerful. Besides these alkaloids, he separated a neutral alcohol-like substance, which he has named *quebrachol* ($C_{20}H_{34}O$). It is crystallizable, lævogyre, and melts at 125° C. The red quebracho yields by a process similar to that employed for the separation of aspidospermine from white quebracho two alkaloids, one of which is quite unstable and readily forms a blue oxidation product. The other exhibits greater stability, and has been named

Loxopterygine by Dr. Hesse. It is white. amorphous, freely soluble in ether, alcohol, chloroform, benzin, and acetone, and but slightly in cold water. The results of analysis lead to the formula $C_{13}H_{17}NO$, or possibly double that formula ($C_{26}H_{34}N_2O_2$) will be found more correct. Besides these two alkaloids the red bark contains tannic acid, but nothing else that is noteworthy.

As a result of his investigations, Dr. Hesse concludes that while both kinds of quebracho bark contain alkaloids, only those obtained from white quebracho are of prominent interest. By their reaction and composition they give evidence of very close relationship to one another. Thus it may well be imagined that the plant forms from aspidospermine the other alkaloids in a simple manner, which may be expressed as follows:

$$\underset{\text{Aspidospermine.}}{C_{22}H_{30}N_2O_2} - H_2 = \underset{\text{Aspidospermatine.}}{C_{22}H_{28}N_2O_2}$$

$$\underset{\text{Aspidospermatine.}}{C_{22}H_{28}N_2O_2} = \underset{\text{Aspidosamine.}}{C_{22}H_{28}N_2O_2}$$

$$\underset{\text{Aspidosamine.}}{C_{22}H_{28}N_2O_2} - CH_3 + H = \underset{\text{Hypoquebrachine.}}{C_{21}H_{26}N_2O_2}$$

$$\underset{\text{Hypoquebrachine.}}{C_{21}H_{26}N_2O_2} + O = \underset{\text{Quebrachine.}}{C_{21}H_{26}N_2O_3}$$

Further, it is not impossible that the plant, in another phase of its development, follows the opposite process in the formation of the alkaloids, starting consequently from quebrachine.

These alkaloids are allied to paytine and paytamine, which more than ten years previously the author separated from a bark at that time unknown to him, but since recognized as from a species of *Aspidosperma*. With the single exception that paytamine does not take a cherry-red color with perchloride of iron, this alkaloid possesses almost the properties of hypoquebrachine, which it closely approaches also in composition, showing only a difference of H_2O. But notwithstanding this similarity the author has not succeeded in obtaining paytamine from the bark of the white quebracho, or in converting hypoquebrachine into paytamine. Attempts to separate hypoquebrachine (and aspidospermine) from the white bark of Payta gave a negative result. The possibility, however, is not excluded that in the course of time an *Aspidosperma* bark may be met with that may contain all these alkaloids together. The genus *Aspidosperma* includes forty species, of which at present only two have been examined. It is noteworthy also that while some specimens of the bark of the white quebracho (*Aspidosperma quebracho*) contain all six of the above mentioned, others contain only three.—Phar. Jour. Trans., March 25 and April 1, 1882, pp. 781–785 and 807–809.

Condurango—Reputed Value in Cancer.—See *Vinum Condurango*, under "Pharmacy."

SAPOTACEÆ.

Rubber—Collection in Colombia.—Consul Edmund W. P. Smith gives an interesting account of the manner of collecting rubber in Colombia. The rubber hunters have the wasteful custom of cutting down the trees, instead of tapping them; hence the trees near the river have been destroyed years since, and the hunters have to go five or more days' journey into the forests before they can find the rubber and bring it out on their backs over rough trails, through swamps and over mountains. The trees which yield the largest supply of rubber flourish along the Sinu and Aslato rivers. According to an immemorial custom, a tree belongs to him who has cut around it. Hence as soon as the hunter finds a rubber tree he clears a space around the trunk, cutting away all vines, underbrush, etc., and marches on again in search of another, the hunt being continued until all the trees in the vicinity of the camp are thus secured. Then begins the work of gathering the rubber. A hole is dug in the ground near the rubber tree, unless some other party is encamped near, in which case the holes are dug near the camp. The bark of the tree is first hacked with a *machete* as high as a man can reach, the cuts being made in form of a V, and the milk (sap) collected as it exudes, and put into the hole which has been dug for it.

After the milk ceases to flow from the cuts a pile of wood or brush is made at the foot of the tree and the tree is chopped down, the branches keeping one end of the tree off the ground and the piles of wood at the foot of the tree doing the same for the other end. Thus the trunk is suspended. The hunter, after carefully placing large leaves on the ground, under the tree, proceeds to cut gashes in the bark of the tree throughout its whole length. The milk is collected from the tree and from the leaves placed under it, and added to the milk first collected. The sap, when it first exudes from the tree, is as white as milk and about as thick as cream; but it soon turns black on exposure to air and light, if not properly watched and cared for. The quantity of milk which is put into one hole depends not only on the size of the trees and their distances apart, but also on the strength of the man who is to carry the rubber from camp to the river, and the track and trail he must carry it over. As soon as a hole has all the milk a hunter intends to put into it he coagulates the rubber by adding some substance, such as the root of "*mechoacan*," by hard soap, etc., and these substances cause the milk to coagulate so fast as to prevent escape of the water which is always present in the fresh sap; and as the rubber and water will not mix, a piece of rubber coagulated this way is full of small cells containing water. Of course a piece of rubber full of holes is not as valuable as a piece of homogeneous rubber. For this reason Carthagena rubber is worth less than Para rubber. Mr. Smith has seen the rubber of this country made perfectly homogeneous, clear, and transparent as amber. It costs no more to make such rubber than to make it full of holes, water, and dirt. It also costs no more to "pack" one pound of such rubber out of the woods than to pack one half pound of porous rubber with its half-pound of water and dirt.—New Rem., December, 1881, p. 359; from Commercial Relations of the United States, July, 1881.

Bully-Tree Gum—Production in Honduras.—This gum, also called *balata*, or *tuno gum*, *leche de popa*, and *gum chicle*, which is much used by manufacturers of submarine cables and chewing-gum, and which has hitherto been largely exported from the West Coast of Africa, is noticed in a late report of Mr. W. C. Burhard, United States Consul at Ruatan, Honduras. It is the hardened juice of

Sapota Muelleri, Bl., a tree which closely resembles that which produces india-rubber, and it seems to be an intermediate between caoutchouc and gutta-percha. Specimens of the gum have at different times been sent from Honduras to the United States, but as the process of preparing the milk was not known, they were black and sticky, and, therefore, probably not sufficiently satisfactory to create a demand. Mr. Burhard has, however, recently sent some specimens to the State Department at Washington, and these were prepared by a simple process, which leaves the gum white, dry, and hard.

The trees which produce the balata or tuno-gum are very abundant on the Atlantic slope of all the Central American republics, as well as in other tropical regions. Large quantities can be supplied at a cost considerably below that of either rubber or gutta-percha, and as repeated experiments in Europe have proven that it can be employed as a substitute for them, either alone or in combination, Mr. Burhard sees no reason why it should not receive the prompt and careful investigation of American manufacturers.—New Remedies, January, 1882, p. 16.

Omphalocarpum Procera—Proximate Analysis of the Fruit.—Mr. W. A. H. Naylor has subjected some of the fruits of this plant, furnished him by Mr. Holmes, to proximate analysis, with a view to ascertaining whether they contained any "theine," since Bentham and other botanists had referred the plant to the same natural order to which the tea-plant belongs. Miers, however, had referred this plant to the Sapotaceæ, and this view is unmistakably supported by the results of Mr. Naylor's analysis, which shows the fruit to contain the following principles: (1) A congener of gutta; (2) a resin allied to fluavil; (3) a glucoside analogous to saponin, but approaching more nearly monesin; (4) a vegetable wax; (5) a neutral principle to which the name omphalocarpin has been given, (6) a bitter and coloring principle; (7) glucose; (8) an organic acid; (9) a fixed oil; (10) gummy and albuminous matter. The fruit yields 2.5 per cent. of ash, having the composition usually afforded by the burning of plants, and loses 50 per cent. of its weight on drying at 54° C.

Omphalocarpin differs from Berthelot's saccharides in that heat is required to develop the purple color, and that it yields no product similar to glucose when acted on by dilute acids. Further experiments, however, are necessary before it is definitely decided that it is not a glucoside. It was obtained in form of snow-white crystals (prisms), presenting the appearance of silky needles; is tasteless, dissolves to a considerable extent in alcohol, less in water, and slightly in chloroform and in ether. The alcoholic solution is neutral to test-paper, and the aqueous solution gives no reaction with iodohydrargyrate of potassium or phosphomolybdate of ammonium.—Pharm. Jour. Trans., December 10, 1881, pp. 478–480.

STYRACEÆ.

Benzoin—Yield of Benzoic Acid.—Dr. Grosser says, genuine Siam benzoin contains, according to Briehholtz, 12.5 per cent.; according to John, 12 per cent.; according to Stoltze, 19.4 to 19.8 per cent. of benzoic acid. Duflos states that by sublimationt ¼ to ⅓ of the acid contained in the resin is obtained. According to Dr. Grosser's experience, the yield amounts to 10 or 11 per cent., some selected benzoin in tears having recently yielded 10.6 per cent. after 43 hours' continuous sublimation.—Chem. and Drug., April, 1882, p. 163, from Pharm. Ztg.

Symplocos Racemosa, Roxb.—Medicinal Value of the Bark.—Kanny Loll Dey, Rai Bahadoor, has found the bark of this tree, which is used extensively in dyeing cotton fabrics red in Bengal, to be an excellent remedy in menorrhagia due to relaxation of the uterine tissue, and he has been so uniformly successful that he advises its introduction into the British Pharmacopœia. In Hindu medicine it is known as a mild astringent, and the native physicians use it extensively either in the form of decoction or powder in cases of bowel complaints, eye diseases, ulcers, etc. The plant is a small tree, of from 12 to 20 feet high, with trunk about 20 inches in circumference, and is a native of Burdwan and Midnapore, Bengal. The bark is somewhat rough, with a spongy, friable exterior gray coat, inwardly of a firm, fleshy texture; when fresh of a pale-yellowish color; taste mildly astringent.—Phar. Jour. Trans., September 24, 1881, p. 257.

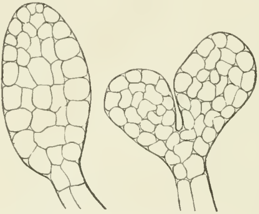
ERICACEÆ.

Ericaceous Plants—Proximate Examination.—Mr. Edward N. Smith, following the process by which Julius Jungmann (Am. Jour. Phar., 1875, p. 202) isolated the constituents of uva ursi, has made a proximate examination of specimens of the leaves of Chimaphila maculata, Pursh, Pyrola elliptica, Nuttall, P. chlorantha, Swartz, and P. rotundifolia, var. asarifolia, Michaux, all of which he had collected himself during the months of June and July, carefully dried and powdered. He determined in them arbutin, ericolin, ursin, tannic, gallic and malic (in Chimaphila maculata citric) acids, gum, sugar, albumen, a small amount of volatile oil, and some coloring matter.—Am. Jour. Phar., November, 1881, p. 549–552.

Kalmia Latifolia—Microscopic Structure of the Leaves.—Dr. H. Paschkis describes the microscopic characters of the leaves of Kalmia latifolia as follows: The epidermis of the upper side consists of two, occasionally also of three layers; the top layer, covered by a stout, uneven, warty cuticle, is composed of very thick-walled, pitted, roundish, polygonal cells. The upper side shows no stomata and few, if any, hairy appendages. The epidermis of the under side consists of a single layer. The cuticle is equally stout as on the upper side, but covered with much more considerable warty irregularities. Between the epidermis-cells of the under side, which scarcely differ from those of the upper side, very numerous stomata are situated; these are very large (with the guard cells occasionally like the epidermis-cells) and surrounded circularly by two (occasionally only one) contiguous cells. In the epidermis of the under side occur very abundantly smaller cells, which, always lying two together, seen from the surface, present somewhat the form of a rounded triangle. In contrast to the upper epidermis-cells, which are colored reddish-brown by caustic potash solution, they become gamboge-yellow by the same treatment. All the epidermis-cells are very thick-walled. The mesophyll consists of a triple delicate palisade layer, and further of roundish thick-walled cells, having large intercellular layers between them.

In the examination of the transverse section of old leaves the above-mentioned cells that are colored gamboge-yellow, can be distinctly recognized as stalks consisting of two rows of cells; the hairs belonging to them were for the greater part not to be found, and partly could not be clearly isolated. Here and there appeared to be one-celled T-formed hairs; in other places the fibrous fragments attached to the stalk could be teased out like empty gland-cases. Some leafy twigs, with quite young leaves with terminal buds were, however, available. On the under side of these leaves especially the glands could be seen and examined, and on the outside of the scaly bracts of the buds also the formation of the hairs. A portion of the hairs consist entirely of a single cell (an epidermis-cell grown to a short point), and these are so numerous that every second or third epidermis-cell appears to be developed into a hair, and the surface of the epidermis appears to be covered with numberless, strongly light-refracting shining prominences; these points appear to be silicified. Further, there are hairs with a double or triple end joint, situated on a short several-celled stalk, which take the form of a T, or less frequently of a star, and are even again once or more frequently branched, and are covered with a thicker cuticle. They are colored by caustic potash solution reddish-brown to red, and do not contain any iron-coloring tannic acid. The glands mentioned (Fig. 41) are ovate, club-shaped, covered by a delicate cuticle. The stalk contains two or three rows of cells, and the glandular body equally as many or more; two of these latter can be recognized as original. Now and then glandular bodies occur having a more or less deep depression (sometimes reaching down to the stalk) at the top. The gland contents are colored brown by caustic potash solution, and upon boiling yield slightly colored drops of strongly light-refracting liquid. Smaller drops are to be seen here and there in the cells of the gland parenchyma, but seldom between two gland-cells. In the mesophyll cells are found, besides a few rosettes of oxalate of lime, also here and there a cell full of resin globules, but chiefly of tannin substances, coloring iron blue and green. The tannin was estimated to amount to 18 33 per cent.—Phar. Jour. Trans., July 30, 1881, p. 86–87, from Zeitschr. Oest. Apoth. Ver.

FIG. 41.



Kalmia latifolia. Gland and Twin Gland.

Rhododendron occidentale—Proximate Constituents.—Charles M. Troppman found in the leaves an acid resin soluble in ether, resin soluble in alcohol, chlorophyll, fat, tannin, glucose, wax, albumen, and pectin ; neither arbutin nor volatile oil could be detected. Two grains of the alcoholic extract produced upon the author a burning sensation in the mouth and throat, continued cough, pain in the stomach, nausea, and flushed countenance. Ten grains given to a dog induced vomiting and purging, and 7½ grains administered subcutaneously killed a rabbit in three hours.—Am. Jour. Phar., April, 1882, p. 177 ; from Proc. Calif. Coll. Phar., 1882, p. 58.

COMPOSITÆ.

Lettuce—Cultivation in Lincolnshire.—Mr. E. M. Holmes gives an account of the cultivation of two species of *Lactuca*, one of the common garden lettuce, and the other *L. virosa*, at Market Deeping. The latter, like henbane, although a biennial, often sends up some flowering stems and runs to seed the first year. Both are used for the preparation of extract, but not for lactucarium, some buyers preferring the extract of the garden plant.—Phar. Jour. Trans., September 17th, 1881, p. 239.

Absinthium—Uses in Greece.—The wormwood plant is one of the most important of the folk medicines of the Orientals, and, according to Professor Landerer, everybody buys the fresh plant, called *Apsifra*, from the botanologists, and prepares from it a wine called *Apsindites vinum* by the ancients.—Chem. and Drug., July, 1881, p. 293.

Inula Helenium—Expectorant and Sedative Properties of the Root.—De Korat has subjected elecampane root, which was formerly valued as a remedial agent, to physiological and therapeutical examination, and, as a result, he recommends it as a certain and safe remedy in cases of catarrhal asthma, in chronic bronchitis, and, in fact, in all ailments of the respiratory organs requiring a powerful expectorant and sedative. The expectorant effect is due to the volatile oil; the sedative effect to helenin or alant-camphor.—Arch. d. Pharm., May, 1882, p. 364; from Med. Central. Zeitschr., 1882, No. 6.

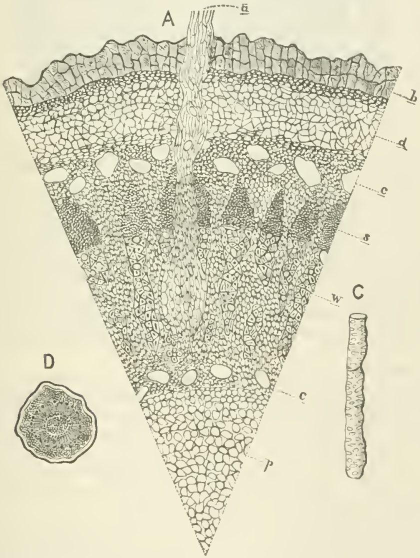
Tanacetum Vulgare—Chemical Examination.—Oscar Leppig has subjected the flowers as well as the herb of *Tanacetum vulgare* to comprehensive examination. The method of Homolle for the isolation of the peculiar bitter principle *tanacetin* gave unsatisfactory results, 10 pounds of the flowers yielding only 0.9124 gram, while, by a method of his own, he obtained from the same quantity of flowers 2.193 grams. Tanacetin constitutes an amorphous, brown, very hygroscopic substance, containing no nitrogen, and having a strongly bitter taste, reminding of willow bark, followed by a cooling, acrid taste; when heated upon platinum foil, a pleasant odor, resembling that of the flowers, is developed, and it finally burns, leaving only a small amount of ash. In contact with concentrated sulphuric acid, it dissolves with yellow-brown color, changing to brown-red, and finally to blue-red. Its composition corresponds to the formula $C_{11}H_{16}O_4$. It seemed to the author probable that the flowers might contain *santonin*, but experiments negatived its presence. The *tanacetic acid* of Peschier could not be obtained. The author believes it to be either a mixture of organic acids, or, more probably, malic acid, as already pointed out by Husemann and Gmelin. On the other hand, the author isolated a peculiar iron-greening *tannic acid*, having the formula $C_{23}H_{29}O_{31}$, which is split by boiling dilute acids into sugar and catechin. He furthermore determined the presence of traces of gallic acid, both in the flowers and herb, volatile oil (flowers, 1.49 per cent.; herb, 0.66 per cent.), fat (flowers, 1.60 per cent.; herb, 1.02 per cent.), waxy substance (flowers, 2.40 per cent.; herb, 3.01 per cent.), mucilage, albumen, tartaric, citric, malic, and traces of oxalic acid, a left-rotatory sugar, resin, metarabic acid, a pararabin-like body, Thompson's wood-gum, etc.—Arch. d. Pharm., May, 1882, p. 368; from Phar. Zeitschr. f. Russ., 1882, Nos. 8–10.

Pyrethrum Flowers—Active Principle.—Mr. Oscar Textor has made a proximate examination of pyrethrum flowers, with a view to determining the nature of the active principle. He finds the activity of the flowers to be due to a soft acid resin, which is readily extracted from them by benzol, and that they do not contain even traces of volatile oil. Unfortunately, the author fails to state whether the flowers used were those of *Pyrethrum roseum* or of *P. carneum*. His results differ from those of R. Rother (1876), who also failed to name the species of pyrethrum, and who ascribed their activity to a glucoside; while Semenoff (1876) had obtained a volatile substance resembling an alkaloid from both species; and Bellesme (1876) had obtained an alkaloid from *P. carneum*.—Am. Jour. Pharm., October, 1882, pp. 491–493.

Silphium Laciniatum, Lin.—Microscopic Structure of the Root, etc.—Mr. L. I. Morris gives an anatomical description of the root of the rosin weed, or compass plant, and the result of a proximate examination of the resinous exudation from the stem and foliage of the plant. The root is from one to three feet in length, and one-half to two inches in diameter, and has a very rough and irregular cortical layer. The anatomical structure is shown in the accompanying illustrations (Figs. 42 and 43). *A* shows a cross-section of the root; the inner portion, comprising one-sixth of the radius of the root, is the pith (*p*), and is composed of loose parenchyma-cells; next are found two circles of resin-ducts (*c c*), the inner circle near the dividing line of the woody tissue (*w*) and the pith, and the outer circle between the wood wedges (*w*) and the outer layer of parenchyma tissue (*d*). These resin-ducts are very irregular in shape. The woody zone between the two rows of resin-ducts is traversed by very wide medullary rays; the wood wedges are irregular in shape, and at the head of each is a wedge-shaped bundle of sieve-tubes (*s*), reaching to the outer row of resin-ducts. Between the outer row of resin-ducts and the cortical layer (*b*) is found a narrow layer of parenchyma-cells, which are more compressed as they near the cortical layer, and this latter is composed of very irregular compressed tissue, resembling stone cells, and is of a yellowish-green color. At (*a*) the development of a rootlet is shown; most of the rootlets originate from the inner row of resin-ducts. *B*, a longitudinal section of the root, shows the very irregular course of the simple resin-ducts; *C* shows one of the pitted ducts, which were the only kind found, although some twenty specimens of the root were examined; and *D* is a cross-section of the root, natural size, from which the different magnified sections were cut.

The oleoresinous exudation from the stem and foliage of the plant congeals in small translucent and internally transparent light-yellow tears, of varied form, breaks with a conchoidal fracture, has an agreeable terebinthinous odor and taste, softens quickly in the mouth, and is easily masticated and kneaded between the teeth; it has a sp. gr. 1.039 at 20° C., and yields 0.5 per cent. ash, 19.66 per cent. volatile oil, and 37 per cent. of acid resin, the other constituents being wax, sugar, and an undetermined white powder. The volatile oil is color-

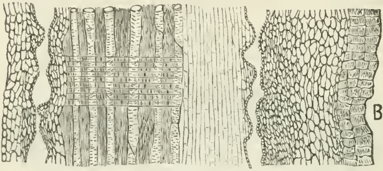
Fig. 42.



Silphium Laciniatum.—A. Transverse section of root, magnified, with origin of rootlet. C. Pitted duct. D. Transverse section, natural size.

less, neutral, boils at 158° C., has a sp. gr. 0.868 at 18° C., is soluble in equal parts of 90 per cent., and in 15 parts of 80 per cent. alcohol, and is evidently a hydrocarbon oil.—Amer. Jour. Phar., October, 1881, pp. 487–491.

FIG. 43.



Silphium Laciniatum.—Longitudinal section of root.

Liatris Odoratissima, Willd.—Botanical and Chemical Characters.—Dr. Thomas F. Wood gives an interesting description of this plant, both in its botanical and chemical relations. The main points have at different times been noted in these reports. The author's examinations seem to point to the presence of a second odorous principle, which remains after the coumarin has been extracted with boiling dilute alcohol. The paper is accompanied by a very handsome lithograph plate, showing the different parts of the plant. See "New Rem.," March, 1882, pp. 66–67.

Parthenium Integrifolium, Lin.—Medicinal Uses, etc.—In view of the fact that the tops of this plant have, in some sections of Indiana, been used with good results in the cure of fever and ague, Mr. Frank B. Meyer has undertaken their analysis. Owing to a lack of material this was only partial and incomplete, but indicates the presence of a colorless crystalline substance. Parthenium tops are employed in the form of hot infusion; this possesses an agreeable orange-like odor.—Amer. Jour. Phar., October, 1882, pp. 494–495.

Hieracium Venosum—Medicinal Uses.—Observations are given by Dr. W. Stump Forwood, in the "Quarterly Transactions of the Lancaster (Pa.) Medical Society," April, 1881, to show that this may prove of value in phthisis. At least it seems to have a well-deserved reputation for that disease among cattle. The infusion is used.—Amer. Jour. Phar., August, 1881, p. 423; from Med. and Surg. Rep.

RUBIACEÆ.

Cinchona Cultivation—Increasing the Quinine Harvest.—Mr. W. Cochran draws attention to some singular experiments that are being conducted at present in Ceylon by a Mr. Schrottky, with the object of increasing, by a process of inoculation, the quinine in cinchona bark. The operation is conducted by causing the trees about to be cut down to absorb certain chemicals. A ring of the bark is taken off the tree near the root; a solution is applied, and then, after about eighteen days, the bark is taken off. Mr. Cochran analyzed two sets of samples from the same trees before and after treatment, the sample being taken from the same height in each case; the increase of quinine was marked, while the total alkaloids varied but little. If more extended observations should confirm this result, the discovery of Mr. Schrottky will prove of the highest importance.—Chem. and Drug., June, 1882, p. 249; from Analyst.

Cinchona Cultivation.—In order to promote the spread of cinchona cultivation in the Island of Jamaica, the British Government has caused to be published some explicit hints and suggestions for raising cinchona plants from seed and establishing cinchona plantations. The paper, as reproduced in "Pharm. Jour. Trans." (March 11th, 1882, pp. 748–750), embraces the following subjects: Raising seedlings in boxes (sowing the seed, watering and shading); raising seedlings in nurseries; establishing cinchona nurseries; establishing plantations (climate, soil, sites for plantations, clearing land, planting, planting-distances, shading, staking, and weeding). The information contained in this document may prove very useful to persons who may contemplate the cultivation of this valuable plant in suitable localities in the United States.

Cultivated Cinchona Barks—Substitution for the Native Bark in Pharmacy.—Mr. E. M. Holmes discusses the propriety of replacing the uncultivated cinchona barks in medicine and pharmacy by cultivated barks, and concludes that this is desirable for the following reasons, viz.:

The larger average yield of alkaloids.

Their freedom from false barks.

The increasing supply, which tends to render it easy to obtain bark of good quality.

With respect to the variety of cinchona bark which can be most advantageously used in medicine and pharmacy, that of the cultivated *C. succirubra* seems to be the most suitable, as already suggested by Professor Flückiger, since it can be procured of good quality, contains all the cinchona alkaloids (except aricine), is less liable to be mixed with hybrids, and is more easily distinguished by its external characters than any other species. Pharmacopœia preparations made from the renewed bark of *C. succirubra*, guaranteed as to the percentage of quinine it contains, would probably give the most satisfaction to the medical profession. As regards the preparations of cinchona bark, the author inclines to the belief that the tincture or fluid extract would be the most efficient.—Yearbook of Pharm., 1881, pp. 507–510.

Discussing the same subject, Mr. W. De Neufville does not agree with Professor Flückiger* altogether, and he thinks that much can be said in favor of South American barks for pharmacopœial purposes. The statement of Professor Flückiger, that flat Calisaya is more scantily and less regularly imported than formerly, is scarcely in accordance with fact, for the supplies of flat bark have so considerably increased during late years, that the drug trade has not been capable of absorbing them. The political difficulties referred to by Professor Flückiger, do not have near as much influence upon the supply as is stated by him, very regular shipments having been made during the late Peruvian war; while the Northern districts of South America, which Professor Flückiger regards as being more favorably situated in this respect, are, on the contrary, subjected to much greater irregularities. Contrary to Professor Flückiger's views also, Mr. Neufville believes that the cultivation of cinchona in Bolivia and Peru will be energetically pursued. He admits that late importations of flat bark have not at all been rich in quinine, but they contained on an average over 2 per cent., and while most Indian barks are richer in the amount of total alkaloids, it is questionable whether druggists are capable of completely extracting the latter. But if, after all, the *flat* American Calisaya is to be abandoned on account of its not being sufficiently rich, why not adopt the American Calisaya *quill?* This has the advantage over all kinds of Indian barks of being much easier to extract, offering greater facilities for distinguishing the quality, arriving regularly during the whole year, and being better known to druggists than any other barks, and is to be had in all grades, from 2 to 6 per cent. of crystallized sulphate of quinine, besides a good proportion of the other alkaloids.—Yearbook of Pharm., 1881, pp. 510–512.

Red Bark—Origin, etc.—Mr. John Eliot Howard, in a comprehensive paper, presents the results of recent information on the subject of "red bark." Mr. Howard, in the first place, considers the limitation of the genus *Cinchona* to those plants which have capsules dehiscent from the base towards the apex the most natural and correct, and this view gains further support by the fact that two specimens of bark, classified by Professor Karsten under the head of Cinchonas, *sectio Heterasca* (*Cinchona pedunculata* and, probably, *C. undata, Krs.*), which are characterized by variously dehiscent capsules, were found by Dr. Paul not to manifest any trace of alkaloid. The difficulty of discrimination increases so much in the definition of species that some seem inclined to throw up the whole subject in despair, and to believe in unlimited hybridity and change. The author, however, believes that fixity of type is the rule, and variability the exception; though he does not deny that the latter occurs (through hybridity) in India. On the other hand, he agrees with Dr. Weddell in thinking that there is not usually much opportunity for this in South America. Even in India the probability is that many of the variations are connected with the following characteristics, observed first by the Spanish botanists. All the different species of Cinchona (so far as observed) exist under different, slightly varying *forms*, of which it seems impossible to say that any one is the original species and the others varieties. For instance, the author has now, growing from seeds gathered by Mr. Robert Cross, two forms of the *Cinchona cordifolia*, from two different localities; one of which, from a place called Coralis Inza, possesses the true cordate form of leaf as represented by Karsten in his plate of *Cinchona cordifolia;* the other, though equally in its marked characteristics the "hard Carthagena," or "cordifolia" of Mutis, does not yet show one leaf true to the type.

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* Pharm. Jour., April 30th, 1881, p. 903.

True "red bark" (*cascarilla colorada*, in Spanish), so named from the color of the juice when exposed, is the product of *Cinchona succirubra* of Pavon; but this, like other species, exists under somewhat different forms. The bark, furthermore, degenerates by age, owing to the resinification or oxidation of the cinchotannic acid, the total quantity of alkaloid diminishing and cinchonine and cinchonidine predominating. The truest "red bark" of India will come to this by age, thus speaking against excessive cultivation, as already previously pointed out by the author. The bark of such trees can only be made serviceable by "renewing;" otherwise the oxidizing process goes forward to the ultimate destruction in old trees of almost all the alkaloids.

There is still much confusion when "red bark" is spoken of or written about, since it may be the produce of:

(*A.*) *C. succirubra.*

α. Glabrous form.

β. Subpubescent form.

(*B.*) *C. coccinea*, Pavon (?).—The *Palo de Gallinago* of the Quitensian Andes, and seen by Mr. R. Spruce in those localities, as also in Pallastanza and Alausi.

(*C.*) *C. officinalis* (?), var. pubescens of Howard, but considered by the late Mr. McIvor a hybrid. The young plants, which arrived in a damaged condition from India, possess much the appearance of *C. succirubra*, and it is therefore provisionally designated by the author as "Howard's sort."

(*D.*) *C. conglomerata*, Pav., *casc. colorada*, producing, according to Cross, the *morada* sort of red bark. According to R. Spruce the plant much resembles a pubescent form of the *cuchicara* sort of red bark.

(*E.*) *C. erythrantha*, Pav. (?), *casc. cuchicara*. This, according to R. Spruce, is probably *true cuchicara*, or the "pig's skin" sort of red bark. It was little valued in commerce of old, the appearance being against it; but it is apparently of greater value than true red bark as regards contents in alkaloid.—Yearbook of Phar., 1881, pp. 494–507.

Commercial Red Cinchona Bark—Inferiority.—Dr. R. V. Mattison draws attention to the fact that the South American red barks of commerce are, as a rule, quite worthless, and that this is equally true of the low priced and the high-priced barks. He is disposed to think that the blame for this condition of the market rests with the retail drug trade, partly through ignorance, and partly through the demand for cheap bark. He thinks that, as a rule, the wholesale trade prefer to supply a good bark. The proper remedy consists in the examination of each parcel of bark purchased by the retail dealer, and its prompt return if below the standard of quality. For general information Dr. Mattison appends some analyses of "commercial red" barks, from a list embracing several hundred.

Analyses of "Commercial Red" Barks.

No.	Quinia.	Cinchonidia.	Cinchonia and amorphous alkaloid.	Remarks.
1		0.6041	0.1214	
2		traces.	traces.	
3			3.2341	
4	traces.	0.3331	1.0433	
5		0.3094	1.4501	
6			1.9012	
7				Very handsome clean bark.
8				Very bright and handsome bark.
9			0.5960	Sold as very high grade.
10			0.4470	
11	0.1761	1.0932		
12	0.3100	0.8831	0.1312	Said to be "very rich." For a commercial red bark it does contain a large amount of cinchonidia.
13	traces.	0.5231	traces.	
14	traces.	0.4322	0.4312	
15			0.8281	
16	0.2134	1.6340		
17	0.2863		2.1847	Dull and musty-looking.
18	traces.	0.7634	0.7631	Very clean and bright.
19	0.4681		0.7438	
20	0.2314		1.7631	

These barks are sold to the retail trade, and also to liquor dealers for making bitters and other fancy preparations. The following table shows the grade of barks supplied to the educated portion of the retail drug trade, and to reputable manufacturers:

High Grade True Cinchona Succirubra.

No.	Quinia.	Cinchonidia.	Cinchonia and amorphous alkaloid.	Remarks.
1	3.296	3.392	1.504	Java Quill Bark.
2	3.514	2.796	1.621	Jamaica Quill Bark.
3	1.241	3.451	3.974	Ceylon Quill Bark.
4	3.004	1.863	1.231	" " "
5	1.528	3.297	4.000	" " "
6	1.361	4.232	4.031	East India Bark.
7	2.341	1.231	1.063	Ceylon Bark.
8	1.1956	4.708	3.184	South American Bark.
9	2.400	1.352	2.932	" " "
10	0.855	3.951	3.824	East Indian Branch Bark.

The amount of quinidia was not estimated. Quinine and cinchonidia were estimated as crystallized sulphate, hence the actual amount of these pure alkaloids is about one-fourth less. Cinchonia and amorphous alkaloid were estimated as alkaloid.—The Pharmacist, October, 1881, pp. 364–369.

Cinchona Cuprea—Botanical Source.—Hitherto, the plant or plants which produce cuprea bark have been unknown to science, although the barks have taken so considerable a place in commerce and in the manufacture of sulphate of quinine. Desiring to fill this gap from a botanical point of view, Mr. José Triana made strenuous efforts to obtain in Colombia specimens of the plants yielding the cuprea bark, which efforts have in a measure been crowned with success. From the evidence secured, he concludes that the barks distributed in commerce at the present time under the name of cuprea bark are afforded by two distinct districts. They also belong to at least two species, which, though nearly allied, are yet different from each other and belong to the genus *Remijia*, which comes very near that of *Cinchona*. These species are *Remijia Purdieana*, Wedd., a plant formerly discovered by Purdie in the forests of Antioquia, upon the left bank of the Magdalena, and *Remijia pedunculata*, Triana (*Cinchona pedunculata*, Karsten). These two Colombian species of Remijia have at first sight, a very great resemblance, in habit, in the form, size and smoothness of the leaves, in their inflorescence, and in their capsules, of almost the same size; they are in reality, however, very distinct and are easily characterized. *R. Purdieana* has the divisions of the calyx lanceolate acute, almost linear, and much longer than the tube of the calyx. The stipules are lanceolate-acute and the capsules are also lanceolate. *R. pedunculata* has the teeth of the calyx small, triangular and almost rounded at the apex; the stipules are obtuse, broad and obovate, and the capsules are shorter than those of *R. Purdieana*, which are elliptic. The resemblance between the barks of the two species is also very great, and it would be difficult to find characters sufficiently marked to distinguish them. They are both, in fact, hard, very compact, relatively heavy, the inner surface smooth and more or less of a wine-red tint, the epidermis thin, or more or less corky, and striated longitudinally. The fracture is not fibrous, as in many cinchonas. While the first-named species grows in the forests of both banks of the Lower Magdalena, in Colombia, in the provinces of Antioquia and Santander, *R. pedunculata* grows from 200 to 1000 meters above the level of the sea, on the eastern slopes of the Eastern Cordillera, on several affluents of the Orinoco and Amazon rivers, such as the Rio Mesa, Rio Negro, Guaviare, Papamene, Tarapote, etc.

By the chemical composition of their barks, the *Remijias* must now take an important place in commerce and therapeutics by the side of the cinchonas, of which they are becoming rivals, which confirms the foresight of Remijo and St. Hilaire. Henceforth the two groups of plants will be coupled together, and as the name *Cinchona*, given by Linnæus to the tree of which the bark cured the Countess of Chinchon, will recall this fact, that of *Remijia* will preserve an analogous one from being forgotten. The following completes the list of the species of *Remijia* additional to the two above mentioned:

Remijia Hilairii, D. C. (Prod., iv, p. 357).—*Syn. Cinchona Remijiana*, St. Hil., Pl. us. Bras.: *Cinchona Velozii* and *Cinchona ferruginea*, D. C.; *Remijia Velozii* and *Remijia ferruginea*. St. Hil., *l. c.; Macrocnemum*, Vell. This species grows in dry and barren places on the mountains of the province of Minas.

R. paniculata, D. C. A little known plant; a native of Brazil.

R. Cujabensis, Wedd. (Hist. Nat. des Quinq.), 93 adn.—*Syn. Ladenbergia Cujabensis*. Klotsch, in Hayn. Arzneigewächse, xiv. This species inhabits forests in the neighborhood of Bahia, in Brazil.

R. Bergeniana, Wedd., *l. c.*—*Syn. Cinchona Bergeniana*, Mart. in Linn. vi; Litt. Ber., 67; *Ladenbergia Bergeniana*, Klotsch, *l. c.* A species indigenous in Brazil.

R. firmula, Wedd., *l. c.; Ladenbergia firmula*, Klotsch, *l. c.* A native of the banks of the Rio Negro, in Brazil.

R. macrocnemia, Wedd.—*Syn. Cinchona macrocnemia*, Mart. Walp. Repert., ii, p. 507; *Ladenbergia macrocnemia*, Klotsch, *l. c.* This species grows on the banks of the Amazon, in Brazil.

R. densiflora, Benth. and Hook., Lond. Journ. Bot., iii, p. 215. A native of English Guiana.

R. hispida, sp. n. in Herb. Spruce, No. 3248. Grows near Esmeralda, on the Orinoco River.

R. tenuiflora, Benth., *l. c.* A species which is found between Barra and Barcelos, on the Rio Negro in Northern Brazil.—Phar. Jour. Trans. April 22, 1882, pp. 861–865.

Cuprea Barks—Characters, etc.—Until recently, only the northern "cuprea" barks, coming from Buccamarango, in the province of Santander, were known. Mr. Arnaud has now received several specimens of these barks from newly-explored regions, and gives the details of some examinations he has made both of the cupreas of the north and of two new types from the regions mentioned. The cuprea barks have quite a special, very compact appearance. They are remarkable for their density, which exceeds that of all other quinine barks, the apparent density varying, according to the author's experiments, from 1.128 to 1.180, taking water as unity. They are, therefore, easily distinguishable from all cinchona barks except "pitaya" and "calisaya," since they sink immediately to the bottom when placed in water. The following specific gravities of typical samples of different cinchona, and cuprea, and cascarilla barks will give a correct idea of these differences:

Genus Cinchona.

Cinchona lancifolia,	sp. gr. 0.617
Cinchona rosulenta,	" 0.614
Cinchona cordifolia (Wedell's coll.),	" 0.844
Cinchona succirubra,	" 0.915
Cinchona Calisaya (from Planchon),	" 1.021
Cinchona Calisaya (Wedell's coll.),	" 1.064
Cinchona Pitayensis (from Planchon),	" 1.077

Genus Remijia.

Cuprea buccamaranga,	sp. gr. 1.128
Cuprea llanos, North,	" 1.179
Cuprea llanos, South,	" 1.160
Bark yielding cinchonamine,	" 1.320

Genus Cascarilla.

Cascarilla magnifolia (Wedell's coll.),	sp. gr. 0.958

In these determinations the author selected barks of the same thickness, taken from the trunk or large branches, so as to have them not differing much in age.

The transverse fracture of cuprea bark, after it has been trimmed with a knife, is characterized by a horny appearance. All the cells are, in fact, filled with a gum-resinous matter that is not present in the ordinary cinchona barks. Notwithstanding this appearance, which is so different from good cinchona barks, the cuprea bark contains sometimes upwards of 2½ per cent. of quinine. It is, therefore, a valuable bark, and justly sought after. The following shows the percentages of alkaloids obtained by the author from different samples of the cuprea barks mentioned in the above table of specific gravities, and it is necessary only to state that the barks designated as *cuprea llanos* are those from the newly-explored regions of the Cordilleras, opposite the *llanos*, or immense plains which, in the eastern part of the United States of Colombia, extend down to the Orinoco; those designated "north" being specimens from the northern part of these mountains, and the others from the "south."

Cuprea Buccamaranga.

	I.	II.	III.	IV.	V.	VI.
Quinine,	1.60	1.68	1.80	1.38	1.29	0.99
Quinidine,	0.47	0.57	0.57	0.37	0.55	0.36
Cinchonine,	0.54	0.55	0.54	0.45	0.60	0.55

Cuprea Llanos (North).

	I.	II.	III.
Quinine,	0.39	0.57	0.78
Quinidine,	0.36	0.45	0.72
Cinchonine,	0.72	0.66	0.67

Cuprea Llanos (South).

	I.	II.	III.
Quinine,	1.35	0.51	0.48
Quinidine,	0.48	0.49	0.48
Cinchonine,	0.99	0.81	0.80

Further experiments have proved the complete identity of the quinine extracted from these barks with that extracted from cinchona, and, as it is therefore now evident that quinine occurs in other than cinchona barks, it will be desirable to search for this alkaloid in the barks of the genera allied to the cinchonas, which, perhaps, like the "cupreas," might contain it in considerable quantity.

Cinchona Cuprea—Presence of a New Alkaloid.—B. H. Paul and A. J. Cownley have separated, with some difficulty, a new alkaloid, which is characterized by them as follows: The *alkaloid* is sparingly soluble in ether, crystallizing from it in long thin plates and sometimes in needles. The *sulphate* resembles quinine sulphate in its sparing solubility in water, thus differing from the sulphates of cinchonidine and quinidine. It crystallizes out in needles. The *tartrate* resembles cinchonidine tartrate in regard to its comparatively sparing solubility in water.—Pharm. Jour. Trans., December 17th, 1881, p. 497.

Mr. W. George Whiffen has also, and independently, observed the new alkaloid of *C. cuprea* above noted, and confirms the observations as to its characters. He finds the new alkaloid to be very soluble in alcohol even when dilute. It is soluble in ether when freshly precipitated, and crystallizes from it in stellar groups of fine tabular prisms, having a pearly lustre. It is also considerably soluble in dilute liquid ammonia. It is not decomposed by cold oil of vitriol, nor by concentrated nitric acid. Sulphuric acid and potassic bichromate produce with it a deep-green coloration. Its salts closely resemble those of quinine. Its sulphate is rather more soluble than that of quinine, but far less so than that of cinchonidine. The cold saturated solution (of the sulphate? Rep.) in water is precipitated by Rochelle salt, but not by the cautious addition of potassic iodide. Chlorine-water and ammonia produce an emerald-green coloration. With excess of acid its solution is fluorescent, even when very dilute. The most characteristic reaction is its action on polarized light; the solution of the sulphate in acid rotating the ray to the left more powerfully than sulphate of quinine. The author hopes shortly to publish its ultimate composition, and provisionally calls the new alkaloid "ultra-quinine," in reference to its similarity to quinine, and of the great action it exerts on polarized light.—Ibid., p. 497.

Cinchona Cuprea—Fresh Occurrence of Aricine and Cusconine.—Referring to the above observations of B. H. Paul, A. J. Cownley, and W. G. Whiffen, Dr. O. Hesse remarks that he has had opportunity of examining a cuprea bark which contained considerable quantities of aricine and cusconine, some cinchonine, and a small quantity of an alkaloid that had a great resemblance to cinchonine, though in several points differing essentially from it. The bark in question, in respect to fracture and hardness, corresponds to the true cuprea bark, and only differs from it in respect to color, which is pale reddish. The author also mentions that the cinchonamine, which Arnaud has prepared from a similar bark, stands without doubt in very close relation to aricine.—Pharm. Jour. Trans., December 24th, 1881, p. 517.

Cinchona Barks—Determination of Alkaloids.—Professor Flückiger boils 20 grams of the bark, finely powdered, with 80 grams of water, and adds to the cold decoction a milk of lime consisting of 5 grams of lime and 50 grams of water. The mixture is evaporated in a water-bath until it is converted by constant stirring into little clots. This mass is subjected to extraction, by percolation, with ether, in a continuous extraction apparatus, the exhaustion being determined when a few drops of the percolate, treated with an equal volume of solution of iodohydrargyrate of potassium fails to produce turbidity. At the end of the operation the ethereal solution of alkaloids is treated with 36 c.c. of a decinormal solution of hydrochloric acid (3.65 grams HCl per liter). The ether is distilled, and hydrochloric acid is again added until the solution becomes acid. It is then filtered, and to the cold liquid is added 40 c.c. of a decinormal soda solution (4 grams caustic soda per liter). The supernatant liquid is allowed to stand until it becomes clear, and soda lye, of specific gravity 1.3, is then added till no further precipitate is produced. The precipitate is washed upon the filter with cold water until the washings no longer cause any turbidity in a clear solution of sulphate of quinine saturated in the cold, and is then pressed between the leaves of filter-paper, and dried in the air. It is then detached from the paper, dried on a watch-glass over sulphuric acid, and, lastly, in the water-bath at 100°. The product should be at least 600 milligrams if the bark contains 3 per cent. of alkaloids.—Chem. News, April 21st, 1882, p. 175; from Jour. de Pharm. et de Chim., February, 1882.

Cinchona Bark—Estimation of Alkaloids.—Prollius observed that if a mixture of 38 grams alcohol, 10 grams chloroform, 2 grams ammonia-water, and 5 grams cinchona bark, is agitated in a stoppered bottle, a wine-red liquid is obtained, containing all the cinchona alkaloids. On mixing the clear decanted liquid with 5 grams finely levigated calcium hydrate, it is at once decolorized, and on slow evaporation the quinine is left of a resinous appearance, while the other alkaloids are crystalline. From the weight of the decanted liquid the weight of the cinchona bark represented therein is easily calculated, and the percentage of alkaloids from the weight of the residue obtained on evaporation.

A simpler process for ascertaining the percentage of quinine and of the other alkaloids soluble in ether is as follows: A mixture is made of 88 ether, 4 ammonia-water, and 8 alcohol, the latter serving merely for uniting the ammonia with the ether. Thirty grams of this mixture are well agitated during several hours with 3 grams powdered cinchona bark; 20 grams of the clear solution, containing the alkaloids in question, on being mixed with a slight excess—5 or 6 drops—of dilute sulphuric acid, separate a thick solution of the alkaloidal salts, from which the ether may be readily decanted; the latter should be well agitated with 2 grams and then with 1 gram of water, in order to obtain all the alkaloids. The mixed aqueous solutions are heated to expel all the alcohol, and, while still warm, precipitated with ammonia. The weight of the precipitate, after washing and drying, multiplied with 50, indicates the percentage of the alkaloids soluble in ether.

The alkaloids may also, though less correctly, be weighed as sulphates, if the ethereal tincture is freed from ammonia by agitation with water, and then very carefully neutralized with dilute sulphuric acid, when the sulphates will at once crystallize out; a slight excess of acid will readily dissolve these salts.—Am. Jour. Pharm., February, 1882, p. 59; from Archiv d. Pharm., August, 1881, pp. 85–87.

Experiments made by J. Biel, lead him to the following conclusions in reference to the above method of Prollius: 1. The ether-ammonium method of Prollius secures a solution of all of the alkaloids present. 2. The period of maceration should not be shorter, but must not be longer than four hours. 3. The direct shaking with chloroform of the extract deprived of resin, gives perfectly accurate results. On the basis of these observations Mr. Biel has modified the method of Prollius, as follows:

Twenty grams of the finely powdered bark are macerated, with frequent agitation, for four hours, with 176 grams of ether, 16 grams of alcohol, and 8 grams of ammonia-water; the mixture is filtered through a folded filter in a funnel covered with a glass plate, and, if necessary, the solution is decolorized with 20 grams of finely powdered calcic hydrate. 100 grams of the solution are evaporated in a beaker on a water-bath to dryness, dissolved in hot water and a few drops of dilute sulphuric acid, allowed to cool, and filtered. After completely washing the filter, the liquid (about 40 c.c.) is poured into a stoppered flask, supersaturated with ammonia, and shaken four times successively with 20 c.c. of chloroform. The chloroform is separated from adherent water in a separatory funnel, evaporated, the residue dried at 110°, and weighed. The weight, multiplied by 10, gives the percentage of alkaloid in the bark. If absolute accuracy is required, the alkaloids are dissolved in dilute acetic acid, filtered through a tared filter, and the resin separated is dried at 110°, weighed, and deducted from the previously ascertained weight.

The author, in a postscript, draws attention to the fact that Dr. De Vrij had previously made almost identical observations in reference to the method of Prollius, of which, however, he had no knowledge. He insists that the period of maceration should be four hours, no more and no less, instead of one hour, as recommended by De Vrij.—Arch. d. Pharm., May, 1882, pp. 350–355.

Cinchona—Assay.—While many very good methods of assaying cinchona barks have been published, Dr. E. R. Squibb considers them all complicated and troublesome and often tedious, and, therefore recommends the following, which is not subject to these objections: Take of powdered cinchona (the finer the powder the better), 5 grams; lime, well burnt, 1.25 gram; amylic alcohol, stronger ether, purified chloroform, normal solution of oxalic acid, normal solution of sodium, and water, of each a sufficient quantity. Add to the lime in a 10 cm. capsule, 15 c.c. of hot water; when the lime is slacked add the powdered cinchona, stir them well together, rinse off the stirrer into the capsule with a little water, and dry the mixture on a water-bath. Rub the mixture into powder in the capsule with the end of a spatula, transfer it to a 100 c.c. flask, and add 15 c c. of amylic alcohol. Cork the flask, digest in a water-bath at a boiling temperature, shaking occasionally for half an hour, cool, add 60 c.c. of stronger ether and shake vigorously and frequently during half an hour. Then filter through a double 10 cm. filter, keeping the funnel covered, rinse the flask with 6 c.c. of a mixture of 10 volumes of amylic alcohol and 40 of stronger ether, and wash the filter and contents with 30 c.c. of the same mixture dropped from a pipette. Evaporate the liquid in a tared 10 cm. capsule to 10 grams, transfer to a 100 c.c. flask, and rinse the capsules with 5 c.c. amylic alcohol. Now add 4 c.c. of normal solution of oxalic acid, shake vigorously and frequently during 15 minutes, and while still intimately mixed, pour the mixture on to a double filter well wetted with water, and filter off the watery portion into a tared capsule. Wash the amylic alcohol remaining on the filter with 5 c.c. of water, applied drop by drop, and return the amylic alcohol to the flask. 1 c.c. of normal solution of oxalic acid, and 5 c.c. of water are then added to the amylic alcohol, which is again shaken vigorously for a minute or two, and the alcohol remaining on the filter returned to the flask. It is then twice successively shaken with 10 c.c. of water, filtered as before, and finally washed on a filter, drop by drop, with 5 c.c. of water. The acid aqueous liquid and washings are now evaporated on a water-bath to 30 grams, transferred to a 100 c.c. flask, rinsing the evaporating vessel with a few drops of water, and the concentrated liquor is shaken vigorously with 20 c.c. of purified chloroform and 5.1 c.c. of normal solution of sodium for a few minutes. While still intimately mixed, the mixture is poured upon a well-wetted filter, and the residual chloroform is washed with 5 c.c. of water, applied drop by drop. The chloroformic solution is transferred to a small tared capsule by making a pin-hole in the point of the filter, the filter carefully rinsed with 5 c.c. of chloroform, the chloroform evaporated off on a water-bath, and the residue weighed. The weight of the residue, multiplied by 20 gives the percentage of total alkaloids, and is correct within 0.1 or 0.2 per cent.—"Ephemeris," No. 3, 1882, p. 76–82.

Cinchona—New Quinometric Process.—Dr. P. E. Alessandri recommends the following new quinometric process, which gives rapid and accurate results, as determined by practical tests. Take 5 to 10 grams of the powdered sample and place it in a percolation apparatus provided with a tap, having previously mixed it into a thin paste with a 3 per cent. solution of oxalic acid, and adding an additional 10 c.c. of the same solution, shake up well and let stand for at least twelve hours. The tap is then turned, and when fully drained, the powdered bark is again covered with the oxalic acid solution. Let stand and drain off, washing the mass with water acidulated with oxalic acid. The mixed percolates are divided into two equal portions and precipitated with excess of ammonia water. The mixtures are allowed to stand and the supernatant liquid is decanted. One of the precipitates is treated with ether, and the other with chloroform in the following manner: Two cylindrical burettes, capable of holding 50 c.c., must be provided with taps at the lower and ground stoppers at their upper extremities. The precipitates are then transferred to the burettes and chloroform is poured into one and ether into the other, the burettes being well shaken several times, after which they are allowed to stand. In each case two strata of liquid are formed, the ether being the supernatant stratum in the one, the chloroform the substratum in the other. They are separated carefully and evaporated in tared capsules. The ethereal solution gives the quinine; the chloroformic solution, the mixed alkaloids,—those other than quinine being determined by deducting the weight of quinine found in the ethereal solution. It is well to wash the aqueous layer from the chloroform experiment with a small quantity of that solvent. In place of ammonia barium hydrate may be used, particularly in the case of barks that are rich in cinchona red, which forms an insoluble compound with baryta. In this case the inside of the tap should be plugged with a pledget of cotton-wool, both liquids, now clear, collected in a beaker, and separated by suitable means.—Pharm. Jour. Trans., June 3, 1882, p. 994, from L'Orosi, V. p. 1.

Coffee—Proximate Examination of the Fruit.—The fruit, according to Boussingault, contains a yellowish, somewhat sweet pulp. The freshly gathered fruit yielded to alcohol 2.21 per cent. of mannit, 8.73 per cent. invert sugar, and 2.37 per cent. cane sugar. It also contains malic acid. The fruit, dried in a drying closet, yielded 47.93 per cent. of seeds. Fresh fruits, dried in Venezuela, yielded 33.4 per cent. of seeds, 5.6 per cent. of dry pulp, and 61.0 per cent. of water.—Arch. d. Pharm., February, 1882, p. 126; from Rép. de Pharm., viii, p. 491.

CAPRIFOLIACEÆ.

Sambucus Canadensis—Partial Examination of the Fruit.—Mr. J. B. Metzger has made a partial examination of the fruit of Sambucus Canadensis, and has found it to contain sugar, gum, tannin, fat, and a resinous substance.—Am. Jour. Phar., November, 1881, pp. 553–554.

Sambucus Canadensis—Proximate Examination of the Bark.—Mr. Charles G. Traub has determined in the bark of this species of elder, valerianic acid, volatile oil, fat, resin, tannin, sugar, and coloring matter, besides several compounds, the nature of which was not ascertained. The air-dry drug was found to contain 13 per cent. of water, and yielded 8.5 per cent. of ash.—Am. Jour. Phar., August, 1881, pp. 392–393.

Hedyosmum Nutans, Sw.—Occurrence and Uses.—Mr. E. M. Holmes has traced a fragrant volatile oil, said to come from Jamaica, under the name of "tobacco-bush oil," to *Hedyosmum nutans*, *Sw.* His authority, Mr. D. Morris, the director of the Botanical Department at Gordontown, Jamaica, states that this plant, called "tobacco-bush," or "headache weed," is common on the Jamaica hills, as about Port Royal and the Blue Mountains, at an elevation of 5000 to 6000 feet above the sea, and that it is generally used by the natives for making tea and for binding around their heads when in pain. Rosenthal ("Pl. Diaph.," p. 175) states that the leaves and flowers are used as a stomachic and antispasmodic. The flavor of the leaves is pungent and aromatic, and the odor like that of scented soap. Mr. Holmes thinks that if the oil could be obtained at a cheap rate it would make a very agreeable perfume for soap; and if it really possesses the property of relieving headache it might form a useful addition to smelling-salts.—Phar. Jour. Trans., January 14th, 1882, p. 581.

UMBELLIFERÆ.

Dill—Cultivation in Lincolnshire.—Mr. E. M. Holmes describes the cultivation of dill at Market Deeping, where about 10 acres are under cultivation. The seed is sown in March, in furrows, in land which must be clean and in good condition, otherwise the weeds soon outgrow the dill. If the weather be favorable the plants are full-grown about the 10th of August, being then about two feet high, and the bright yellow of the blossom turns, toward the end of the month, to a rich golden brown as the fruit begins to ripen. If the weather be wet, and the ground sodden during the summer, the plants are apt to damp off, but moisture, when the fruit begins to form, is beneficial rather than otherwise. As the plants do not all ripen simultaneously, and the mesocarps hang very lightly and easily fall off the umbels when ripe, the heads are collected for distillation when they are fully formed and before they are quite mature, by cutting the umbels off close beneath the base; but when the seed is to be kept the plants are cut down as near the ground as possible, when the fruits begin to assume a brown color. After lying on the ground for a few days, to allow the seed to thoroughly ripen at the expense of the stem and leaves, the seeds are separated by sifting, the best being kept for seed, and the rest distilled. During the period of ripening much seed is lost, and a field may then produce another crop without being sown. The oil distilled from the green or immature fruit is said to have a more pleasant flavor and comes over more quickly than if distilled in winter from dried seed. The stills are described under Peppermint (which see). The yield of oil averages 3 to 4 pounds per cwt.

Caraway.—About 10 acres, yielding 8 to 10 cwts. per acre, are under cultivation. Although the plant is biennial, as with henbane some plants persist in flowering the first year. It is sown in April, in good soil, and the seed is collected in July, and, adhering more firmly to the umbel than in dill, it has to be thrashed to separate it.—Phar. Jour. Trans., September, 1881, p. 238.

Angelica—Cultivation.—The cultivation of angelica is carried on in France, principally near Clermont-Ferrand, to a considerable extent, the annual average production being 100,000 kilos. The leaves, root, and fruit are employed in medicine and for the manufacture of liquors (de la Grand-Chartreuse and imitations); the stalks, which often attain a height of 1.50 meter and a diameter of 0.6 meter, are used by confectioners, after the removal of the fibrous layer, by boiling them slowly in water, and afterwards repeatedly in syrup.—Amer. Jour. Phar., January, 1882, p. 11; from Rép. de Phar., 1881, p. 519.

Osmorrhiza Longistylis, Rafinesque (Uraspermum Claytonii, Nutt.; Myrrhis foliis trilobatis, Gronovius, Virg.)—Examination of the Roots and Rhizoma.—Mr. Howard L. Green has subjected the roots and rhizoma of this plant, commonly known as Sweet Cicely, Sweet Root, Paregoric-root, and Sweet Anise, to proximate examination, and finds them to contain, besides the volatile oil described below, a glucoside (not nearer determined), a fatty body, fixed oil, resin, tannic acid, albumen, glucose, starch, and extractive. On incineration, 100 grains of the air-dry root gave 6.5 grains of ash, containing carbonates, sulphates, chlorides and phosphates of potassium, calcium, and magnesium, of which 3.75 grains was soluble in water. The fresh root contains 68.5 per cent. of moisture, and it yields 0.1 per cent. of

Volatile oil, of a light brown-yellow color, and having an odor and taste recalling that of anise, but distinct. The oil is heavier than water, and solidifies at 38° F. to a crystalline mass resembling oil of anise, with which it may be identical.

Under a microscope, magnifying 40 diameters, the mericarps are seen to be deeply grooved along the commissures, giving a cross-section the appearance of a horseshoe. Beneath the epidermis are the five characteristic ribs, which are composed of wood-bundles. The embryo is of the same shape as the mericarp, white, and appears to be composed of a number of almost square cells arranged in layers parallel to the groove. The rhizome shows three or four wood rings of a yellow color, traversed by numerous broad medullary rays; the pith is regularly divided transversely by air-cavities. The root consists of a number of delicate wedges, arranged somewhat pentagonally around a large pith and traversed by broad medullary rays; the whole structure is of a yellowish-white color, the wood being slightly darker. The rhizomes are 1 to 2 inches long, and have a number of fusiform roots attached, which are from 3 to 12 inches in length and ⅛ to ⅜ inch in diameter, of a light-brown color when fresh, but darkening by age. Under the microscope the rhizome and roots are seen to be covered by a yellowish epidermis, through which are scattered numerous cells containing a yellow, resinous, or coloring matter. The plant has never been recognized by medical authorities, but is to some extent used throughout the country as a mild carminative and expectorant in the form of infusion and fluid extract.—Amer. Jour. Phar., April, 1882, pp. 149–152.

RANUNCULACEÆ.

Aconite — Cultivation in Lincolnshire.—According to Mr. E. M. Holmes, two species of aconite are grown at Market Deeping to meet the requirements of buyers: *A. Napellus*, yielding an extract which is not perfectly smooth unless made so artificially, while *A. paniculatum* yields one which gives more satisfaction, on account of its being more easily worked and presenting a smoother appearance and less resinous character. The former plant flowers in May and June, and the latter from the middle of August to the middle of September, when *A. Napellus* has scattered seeds and its leaves are turning yellow.—Pharm. Jour. Trans., September 17, 1881, p. 239.

Aconitum Paniculatum—Alkaloidal, Constituents, etc.—Referring to the above observation of Mr. Holmes, Mr. E. S. Cleaver gives the result of some experiments made with the fresh herb of *Aconitum paniculatum*, placed at his disposition by Mr. Holland, together with specimens of extract prepared from it and from *A. Napellus*. The extracts differed considerably in appearance and taste. That from *A. paniculatum* was firm, dark green, and had a slightly bitter taste, but without any of the peculiar after-effects produced by the extract of *A. Napellus*. The latter was dark-brown and much more hygroscopic, and was totally unlike a green extract of the B. P. It produced, when a small quantity was taken, the characteristic tingling, etc. The herb of A. paniculatum was divided into flowers, stems, and leaves, 112 pounds yielding, when dried, 22 pound of stems, 8 pounds of leaves, and 3 pounds of flowers. The flowers yielded 0.9 per cent. of alkaloids, the leaves 0.1 per cent. The quantity obtained from the stems—if any—is not stated. The extract yielded 0.3 per cent. of alkaloid. This alkaloid, in all cases, was bitter, but was free from the characteristic pungency of the active aconite bases. Specimens of the root could not be obtained, but will be examined when the next autumn's crop can be secured. The author considers it probable that the alkaloid of *A. paniculatum* is identical with picraconitine, and draws special attention to the fact that extract of aconite is now being used (in England? Rep.) which does not contain the active principle of *A. Napellus.*—Pharm. Jour. Trans., March 4, 1882, pp. 722, 723.

Aconitum Napellus, L., and other species of Aconite.—Mr. Arthur, Meyer contributes a comprehensive study of the officinal aconite and of the more important species related to it. He classifies the aconites as follows:

- I. *Aconites having a rhizome.*
  - *Aconitum Lycoctonum*, L.
- II. *Aconites having poisonous tubers.*
  - *a.* Yellow-flowering species.
    - *Aconitum Anthora*, L.
  - *b.* Blue-flowering species.
    - *α.* Indigenous (European).
      - *Aconitum Napellus*, L.
      - *Aconitum paniculatum*, Lam.
      - *Aconitum variegatum*, L.
      - *Acônitum Stœrkeanum*, Rchb.
    - *β.* Exogenous species.
      - *Aconitum ferox*, Wallich.
      - *Aconitum uncinatum*, L.
      - *Aconitum Fisheri*, Reich.
- III. *Aconites having non-poisonous tubers.*
  - *Aconitum heterophyllum*, Wallich.

This last species differs from all the other blue-flowering species of aconite in the structure of the leaves. The anatomical structure of the tubers, also, differs from all the other blue-flowering kinds. As regards the collection of aconite in Germany, the author is of the opinion that the tubers of all the blue-flowering indigenous species are indiscriminately collected. The tubers of these different blue-flowering aconites show no distinction either in form, growth, or anatomical structure. As regards the poisonous Indian species of aconite, it seems probable that only the tubers of *Aconitum ferox* reach European commerce, notwithstanding that on the authority of Hooker and Thomson different species are collected under the common name of "bish." The author's paper is largely devoted to the subject of *A. Napellus*, and is profusely illustrated. Most of the subject-matter cannot be properly condensed, and reference must, therefore, be had to the original paper, in Archiv d. Phar., September, 1881, pp. 171–187, and October, 1881, pp. 241–276.

Nigella Damascena—Distinction of the Seeds from those of N. sativa.—Mr. Henry G. Greenish some time ago (see Proceedings, 1880, p. 161) communicated the results of some experiments made with the seeds of *Nigella sativa.* Since then he had received a sample of nigella seed, which on examination proved to be the seeds of *N damascena.* These latter resemble the seeds of the former species very closely in external appearance, but they may be readily distinguished by their exhaling, when rubbed between the fingers, a remarkably pleasant odor, recalling that of strawberries, which, indeed, it closely resembles. This peculiar odor does not appear to have been noticed by all pharmacologists, and it, moreover, appears to distinguish it from other species of *Nigella*, such as *N. arvensis* and *N. fœniculum*, which Mr. Greenish has had opportunity to examine. Very characteristic from a chemical point of view appears to be the absence of *melanthin*, the glucoside isolated by the author from the seeds of *N. sativa*, and the circumstance that the seeds of *N. damascena* yield a fluorescent body to petroleum spirit, which those of *N. sativa* do not.* Nevertheless, it is not impossible that under certain conditions, or at some period, the latter may also contain this fluorescent body, while on the other hand, it may be absent from *N. damascena* seeds. These questions may be decided by cultivating the plants and examining them at different stages of their development, which the author proposes to do during the present year. Mr. Greenish has examined eight specimens of nigella seeds from different sources, and found four of them to be those of *N. sativa*, and the other four those of *N. damascena.* In each case they agreed in the distinction above-mentioned, viz., absence or presence of odor, of melanthin, and of the fluorescent body. Besides their odor, their rounded form, and the transverse furrows of the seeds of *N. damascena*, distinguish them from those of *N. sativa.*—Pharm. Jour. Trans., February 18, 1882, pp. 681, 682.

Thalictrum macrocarpum—Constituents of the Root.—The root contains, according to Hanriot and Doassans, a neutral principle, *macrocarpin*, and an alkaloid, *thalictrina.* The alcoholic tincture is concentrated in a vacuum, then treated with ether, and finally precipitated by water. Macrocarpin crystallizes in yellow needles, is insoluble in ether, but soluble in water, alcohol, and more so in amyl alcohol; it dissolves also in ammonia, and is precipitated by acids. By exhausting crude macrocarpin with ether thalictrina is obtained in colorless crystals, insoluble in water, and soluble in ether and alcohol. Its nitrate is crystalline, and in its properties and reactions it resembles aconitina.—Amer. Jour. Pharm., July, 1881, p. 336; from Bull. Soc. Chem. (2), xxiv, 33, 34.

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* In his paper on *Nigella sativa* (see Proceedings, 1380, p. 162) Mr. Greenish also describes a fluorescent body; but in all seeds of the same species since examined he found this absent, and he is now inclined to believe that the fluorescent body is due to an admixture of the seeds of *N. damascena.* Reinsch, in 1841, also isolated an essential oil from the seeds of *N. sativa*, which showed a magnificent blue fluorescence, whilst Flückiger, in 1871, obtained similar results.—REP.

BERBERIDACEÆ.

Berberis Aquifolium, var. *repens* (*Oregon Grape*)—*Proximate Analysis of the Root.*—Mr. Henry B. Parsons has subjected this root to proximate analysis, with the following results:

Moisture,		6.08
Ash, soluble in water,	1.63	
Ash, insoluble in water,	2.08	
		3.71
Crude fibre,		23.33
Albuminoids, insoluble in water and alcohol,	3.15	
Albuminoids, soluble in alcohol, insoluble in water,	1.68	
		4.83
Berberina,		2.35
Oxyacanthina,		2.82
Black substance with oxyacanthina,		0.23
Resin, insoluble in ether, soluble in alcohol,		1.91
Sugar (traces), organic acids (?), extractives, colors,		4.55
Ether extract, chiefly wax,		1.36
Gum and yellowish color,		5.56
Starch isomers, by titration,		18.05
Substances extracted by acid and alkali,		25.22
		100.00

The roots, as received, were in broken pieces, about a foot in length, and one-fourth inch in diameter; they had a brownish exterior layer, underneath which was a bright yellow layer. The powdered sample had a bright lemon-yellow color, and a decidedly bitter taste. From his analysis Mr. Parsons judges that the activity of the drug is dependent upon the two alkaloids,—berberina and oxyacanthina.—New Rem., March, 1882, pp. 83, 84; from Report of the U. S. Com. of Agricult. for 1880, p. 139.

RUTACEÆ.

Buchu Leaves—Non-existence of Salicylic Acid as a Component.—In 1876 (see Proceedings, 1876, p. 159) Professor E. S. Wayne had obtained from buchu, by distillation, a crystalline product, which by treatment with caustic soda yielded salicylic acid. Professor Wayne had also examined some crystals, which Mr. William H. Thomson, then of W. H. Merrell & Co., had obtained during the distillation of weak tincture of short buchu leaves (Barosma betulina); but these simply gave a black color with ferric chloride, as did also some crystals obtained from the oil distilled by Professor Wayne from another lot of the same variety of buchu. Recently Mr. Thomson, now of Philadelphia, again observed the formation of these crystals, near the exit end of the worm-condenser, and submitted them for examination to Professor J. M. Maisch, who finds them to be the stearopten of buchu described by Professor Flückiger (see Proceedings, 1881) as diosphenol. They gave, like the crystals previously examined by Professor Wayne, a blackish color with ferric chloride, and were free from salicylic acid. An examination of the stearoptens of four samples of oil of buchu, which had deposited during the past fifteen years, proved them to be diosphenol, and they failed to yield salicylic acid. It is remotely possible that salicylic acid may be produced by buchu leaves under the influence of fermentation, Professor Wayne having obtained it from oil distilled from partially exhausted buchu leaves; but Professor Maisch considers it not unlikely that the presence of some other kind of leaves may account or the yield of salicylic acid observed by Professor Wayne.—Am. Jour. Phar., July, 1881, p. 333.

Ailanthus—Use of the Bark as a Vermifuge.—Professor X. Landerer draws attention to the use, in Greece, of the bark of the ailanthus, or tree of heaven, as a vermifuge for dogs. He states that in the Levant the costly European hunting dogs suffer much from worms, and that this bark has proven a good vermifuge in such cases.—Drug. Circ., January, 1882, p. 6.

GERANIACEÆ.

Oxalis Acetosella—Use of the Inspissated Juice as a Cautery.—Dr. Edgar Eltinge reports in the "Annals of Anatomy and Surgery," that the expressed inspissated juice of this plant, properly formed into a suitable paste, has been successfully used by him as a local application in the removal of an epithelioma of the lip, after no special good had resulted from the use of Canquoin's zinc chloride paste, which had produced excessive hemorrhage. Three successive applications of the wood-sorrel paste, made at intervals of twelve hours each, were entirely sufficient to destroy the growth, the resulting eschar separating on the eighth day, leaving a healthy granulating surface, which healed rapidly. Not a drop of blood issued throughout, and at the end of two years there were no signs of recurrence. The pain produced by the application of the caustic was intense, demanding all the patient's fortitude to enable him to endure it; however, the duration did not exceed half an hour after each application.—Am. Jour. Phar., May, 1882, p. 252.

Linseed—Varieties in English Commerce.—Mr. E. M. Holmes draws attention to the varieties of linseed imported into England, but more particularly to their contamination, as well as adulteration, with certain weed seeds. By far the largest part of the linseed is imported from Russia and India, but Germany, Holland, Chili, Turkey, and Gibraltar also contribute to the supply. These seeds vary very materially in quality, containing sometimes enormous quantities of foreign seeds. Thus Bombay linseed contains from 1¾ to 4½ per cent., and fine St. Petersburg linseed contains 3 per cent. of foreign seed only, while common (Rijeff) St. Petersburg linseed, according to grade, has been found to contain from 41 to 70 per cent. of such, and Riga linseed from 35 to 49½ per cent. These large amounts of weed seed do not occur naturally, but appear to be added to form second, third and fourth qualities, according to the price buyers are prepared to pay. The average amount of foreign seeds naturally present would probably be 7 to 8 per cent., or from very foul land 20 or 30 per cent.; but good linseed, containing not more than 4 per cent. of weed seed, can always be obtained by those who are willing to pay the proper price for it. The weed seed, being generally smaller than linseed, may be separated by sifting. Mr. Holmes found, that although there was great similarity in the weed seed most abundantly found in European varieties of linseed, yet there were generally present, sometimes in small quantity only, some seeds in each commercial variety which might be regarded as distinctive of the country in which the linseed was collected. A brief description of such seeds, accompanied by numerous illustrations, is given in the original paper; but space will only admit of mentioning them in this report, as follows:

English Linseed.—Produced chiefly in Lincoln, Cambridge, Suffolk, Devon, and Somerset. As a rule, remarkably free from weed seeds, but those generally found are the seeds of a species of *Lolium* and of *Polygonum Persicaria*, while those of *Chenopodium glaucum* are of very rare occurrence.

Dutch Linseed.—The weed seeds found in this are almost exactly the same as in the English linseed, but the seeds of *Chenopodium album* are found most abundantly. The characteristic weed seed, however, is that of *Silene inflata*. Another seed, which is figured but not identified, is also present in the Dutch linseed. Next to the English this is the purest variety of linseed.

Baltic Linseed.—Imported from St. Petersburg, Revel, Riga, Libau, and Windau, Russia, and Memel, in Prussia. The northern varieties, such as are grown at Archangel and Homel, are remarkable for the preponderance of the seeds of *Camelina sativa* and *Spergulia arvensis*; the seeds of *Lolium* and of *Polygonum Persicaria* are also of common occurrence. In Lithuanian specimens the seeds of *Centaurea Cyanus* are of common occurrence, while the northern varieties, grown at Karatsched and Orel (Orlov.), contain, in addition to the above-mentioned seed, those of *Panicum miliare, Lam.*?

Black Sea Linseed.—Imported from Taganrog and Odessa. Remarkable for the absence of the grass seed (*Lolium*) above mentioned, and for the presence of another grass seed (*Setaria sp.*), and of a species of Sinapis, and another cruciferous seed. The seeds of *Polygonum Convolvulus*, of *Agrostemma Githago*, and of *Panicum miliare, Lam.*, ? are also present, and the latter, together with the grass seed (*Setaria sp.*) are very characteristic for this variety as well as the *Turkish Linseed*.

Calcutta Linseed.—In this the seeds so characteristic of the European linseeds are absent. It contains numerous cruciferous seeds, in which character it approaches Black Sea linseed, but these are mostly of a yellow or brown tinge, and not of the prevailing black hue of those found in the South Russian varieties. The weed seeds especially characteristic of Calcutta linseed are those of a *Sinapis*, of an *Ervum*, of *Sesamum indicum*, and sparingly of a very characteristic triangular seed, which has not been identified.

In the various linseeds above mentioned, the seeds average 12 to 14 to a grain weight. The following are larger, averaging about twice the size, so that six or seven are equal to 1 grain.

Bombay Linseed.—This is not only larger but the surface also has a brighter and more polished appearance than the Calcutta linseed. It contains, as a rule, fewer globular cruciferous seeds. Besides the *Sesame* seeds, it contains the small pods of a species of *Medicago*, and some seeds rather larger but resembling the *Setaria* seeds found in Russian linseed. Neither the undetermined weed seed found in Calcutta linseed, nor any European weed seed appear to occur in Bombay linseed.

Ionian Linseed.—This is remarkable for its purity and large size. Two seeds found in it appear to be characteristic. The one is that of *Silene*, the other is an *Ervum*. It also contains a few *Lolium* seeds.

Catanian Linseed.—This differs very little from Ionian except in containing rather more weed seed. Two of them are very characteristic, but are not identified. Other weed seed, of more frequent occurrence, are those of a species of *Galium*, of *Medicago*, and of *Lolium*.—Phar. Jour. Trans., July 23d, 1881, pp. 61–62; and August 13th, 1881, pp. 137–140.

Flaxseed—Percentage and Composition of Ash.—As a mean of 31 analyses A. Laudreau obtained 3.60 per cent. of ash, of which 24.10 per cent., with 4.6 per cent. phosphoric acid, was soluble in water; 71.10 per cent., with 27.0 per cent. of phosphoric acid, soluble in nitric acid, and 4.80 per cent. of silica and insoluble matter. The ash of Russian flaxseed contained 40 per cent. of phosphoric acid; the ash of flaxseed cultivated in France decreased in phosphoric acid to 15 or 20 per cent. in the second year.—Am. Jour. Phar., November, 1881, p. 552; from Ann. agronom., vi. p. 315.

MALVACEÆ.

Althæa Rosea—Presence of Asparagin in the Root.—Mr. Edo Classen has obtained asparagin from the fresh root of the garden hollyhock, as follows: 100 parts of the root were crushed, extracted with cold water, with the addition of a small quantity of quicklime, in order to make the mucilage insoluble. The extraction was once more repeated, and the clear liquid evaporated to the consistence of syrup, or about 6½ parts. This extract was precipitated by an equal weight of alcohol, the precipitate (about 3¼ parts) diluted with half its weight of water, and again precipitated with alcohol (about an equal quantity = 5 parts). The crystalline precipitate formed by this operation was separated from the liquid by collecting it on a cloth; it was then pressed, dissolved in hot water, treated with animal charcoal, and crystallized. The weight of the pure white crystals was equal to 0.2 parts.—New Rem., November, 1881, p. 325.

TERNSTRŒMIACEÆ.

Tea—Cultivation and Manufacture in India.—The following abstract from "Imper. Gaz. of India." iv. p. 504, in "New Rem." (January, 1882. p. 23), gives some interesting information regarding the cultivation and manufacture of tea in India. These processes are very similar throughout the whole of India, with the exception that in Upper India the leaf is prepared as green tea for the markets of Central Asia. Three main varieties are recognized—*Assam*, *China*, and *Hybrid*. The first is the indigenous plant, sometimes attaining the dimensions of a tree; yielding a strong and high-priced tea, but difficult to rear. The China variety, originally imported from that country, is a short bushy shrub, yielding a comparatively weak tea and a small out-turn per acre. The third variety is a true hybrid, formed by crossing the two other species. It combines the qualities of both in varying proportions, and is the kind most sought after by planters. In all cases, the plant is raised from seed, which, in size and appearance, resembles the hazelnut. The seeds are sown in carefully prepared nurseries in December and January, and at first require to be kept shaded. About April the seedlings are sufficiently grown to be transplanted—an operation which continues into July. The site selected for a tea garden should be comparatively elevated land, for it is essential that water should not lodge round the roots of the plants. In Assam, which may be taken as the typical tea district, the most favorite situation is the slopes of low hills, that everywhere rise above the marshy valleys. On the summit may be seen the neat bungalow of the planter, lower down the coolie lines, while the tea-bushes are studded in rows with mathematical precision all round the sides. The best soil is virgin forest land, rich in the decomposed vegetable matter of ages. Great pains are expended to prevent this fertile mould from being washed away by the violence of the tropical rains. In bringing new land into condition, the jungle should be cut down in December, and burned on the spot in February. The ground is then cleaned by the plough or the hoe, and marked out for the seedling by means of stakes planted at regular intervals of about four feet from each other.

For the first two years nothing is required except keeping the plants clear of weeds. Afterwards, it is necessary to prune the luxuriant height of the bushes in the cold season of every ensuing year. The prunings should be buried around the roots of the plant for manure. The plants begin to come into bearing in the third year, and gradually reach their maximum yield in their tenth year. The produce consists of the flushes or successive shoots of young leaves and buds, which first appear in the beginning of the rainy season. There are from five to seven full flushes in the season from March to November. The bushes are picked about every ten days by women and children, who are paid by weight on bringing their baskets to the factory, when the operation of manufacture forthwith begins. The leaf is first spread out lightly on trays or mats, in order that it may "wither," *i. e.*, become limp and flaccid. Under favorable conditions this result is effected in a single night; but sometimes the natural process has to be accelerated by exposure to the sun or by artificial heat. The next operation is known as "rolling," performed either by the manual labor of coolies or by machinery. The object of this is to twist and compress the leaf into balls, and set up fermentation. The final stage is to arrest fermentation by drying, which may be effected in many ways, usually by the help of machinery. The entire process of manufacture after "withering," does not take more than about four hours and a half. All that now remains to do is to sort the tea in sieves according to size and quality, thus distinguishing the various grades from Flowery Pekoe to Broken Congou, and to pack it for shipment in the well-known tea chests.

VITACEÆ.

Malaga Raisins.—Production and Preparation.—Mr. Marston, British Consul at Malaga, in a recent report, gives some interesting information relative to the cultivation of grapes and production of raisins, from which the following brief description of the process of preparing raisins may find place here. There are three different methods of preparing the raisins—washing, drying by steam, and drying in the sun. To dry the grapes by the washing method, furnaces are constructed, of feeble draught, in which wood is used as fuel; a round kettle, varying in capacity from 300 to 400 liters, receives a lye formed from the residue or refuse of the grapes after pressing. Placed in wire colanders, with long handles, containing from 2 to 3 kilograms each, the grapes are plunged in this lye boiling at a temperature of about 212° F. If after this immersion the skins are not sufficiently shrivelled, the grapes are immersed a second time. Much skill and experience appears to be necessary in this operation, to prevent the bursting of the skin and to recognize the fissures that may form. The process offers, among others, the inconvenience of exposing the raisins to fermentation during transportation, it necessitates the expense for the construction of furnaces, besides the indispensable last drying in the sun. The results are always relatively inferior. The method of drying by steam is as follows: After having been exposed nearly twenty-four hours to the sun's rays, the grapes are carried on boards under cover to a building arranged with shelves, 6 or 7 feet high. A temperature of 160° F. is produced by steam that circulates in an iron tube 7 or 8 inches in diameter, through the entire building. At the end of twenty-four hours the drying is usually finished, when the raisins are transferred to an adjoining room, constructed for the purpose, where they are allowed to cool gradually. When entirely cool, they are carried to the store for packing. But the process most generally employed in Malaga is that of sun drying. For this purpose it is sufficient to construct divisions of brick or stone exposed to the sun's rays in an inclined position, say 10 yards long and 2 yards wide; the divisions or apartments are built up at one end with a sort of triangular masonry, which from a distance gives them the appearance of a range of uniform tombs. The triangle is so constructed, that the sun never fails to shine upon the contents, the interior being covered with fine gravel, which attracts the heat. Immediately after gathering, the grapes are placed in these divisions and exposed to the sun. Experienced cultivators affirm that during the heat in August they attain a temperature of 145° F. At nightfall, to protect the fruit from the heavy dews or rain, a cover of canvas or sail cloth, sliding on rings, is caused to cover the grapes entirely. In many places boards or planks are used for the same purpose. During the process of drying those grapes which remain green or are spoiled are carefully removed, and each grape is turned in order to preserve a uniformity in the darkening of color. Competent judges give the preference to this simple method of drying, as much for the results as for the simplicity of the process. By the scalding process only four days are required, whilst by the sun-drying process it takes ten days; but this loss of time is largely compensated by the economy of expenditure. Very great care must be exercised in the sorting and picking of the dried fruit, a single bruised or broken fruit being capable of spoiling an entire box.—Pharm. Jour. Trans., April 8th, 1882, p. 827.

American Wines—Composition.—Mr. Henry B. Parsons, in "Report of the Commissioner of Agriculture," for 1880, gives the names, source, and composition of one hundred and sixty-four samples of American wines. The paper possesses high interest, but should be consulted in the original. The abstract of the same, in "New Remedies" (April, 1882, pp. 114–116), is also very thorough, but is too lengthy to be reproduced here. The following table, showing the averages of sixty-four analyses of dry red wines, and of fifty-one analyses of dry white wines, may be useful for reference, and is, therefore, reproduced:

CONSTITUENTS, ETC.	DRY RED WINES.			DRY WHITE WINES.		
	Average sixty-four analyses.	Highest.	Lowest.	Average fifty-one analyses.	Highest.	Lowest.
Specific gravity	0.9933	1.0011	0.9894	0.9926	1.0105	0.9845
Per cent. alcohol, by weight	8.92	12.21	5.71	9.35	13.94	7.03
Per cent. alcohol, by volume	11.04	15.21	7.17	11.70	17.37	8.80
Per cent. total residue	2.28	3.16	1.65	1.75	2.64	1.18
Per cent. total ash	0.231	0.532	0.130	0.181	0.335	0.090
Per cent. glucose	traces.	0.450	none.	traces.	0.300	none.
Per cent. total acid, as tartaric	0.723	0.997	0.511	0.680	0.855	0.422
Per cent. fixed acid, as tartaric	0.360	0.646	0.226	0.313	0.561	0.121
Per cent. volatile acid, as acetic	0.290	0.517	0.138	0.291	0.508	0.068

Wine—Methods of Examination.—Professor L. Roesler recommends the following quantitative and qualitative methods for the examination of wines:

QUANTITATIVE DETERMINATIONS.

Determination of Specific Gravity.—The most accurate results are obtained by the aid of Sprengel's pyknometer; for practical purposes an accurate aerometer will suffice. The instrument should be thoroughly cleansed before every operation by washing with water and alcohol, and should be carefully protected from dust.

Determination of Alcohol.—From 100, or better, from 200 c.c. of the wine two-thirds are distilled off, the distillate is brought to the original volume (200 c.c.) with distilled water and the specific gravity determined. But inasmuch as some acetic acid passes over into the distillate, 50 c.c. of lime water and 50 c.c. of water are added to the first distillate and 100 c.c. are again distilled off. The percentage of alcohol found in this distillate, divided by two, represents the total alcohol percentage of the wine. When wine froths much 2 per cent. of tannin is added.

Determination of Extract.—Evaporation on a water-bath always gives low results, partly because glycerin is vaporized and partly because the extract decomposes. The temperature must not be over 80°. It is best to dry in a vacuum; the wine, contained in a flask, is heated to 60°, and then introduced under the bell-glass. The extract may also be calculated from the specific gravity by Balling's tables.

Determination of Free Acids.—This is best accomplished by titration with solution of potassa, the titre of which is such that by the neutralization of 10 c.c. of the wine the quantity of tartaric acid in a liter of the wine is directly indicated. For the determination of the *cream of tartar* 10 c.c. of the wine are mixed with 50 c.c. of ethyl-ether, and allowed to stand 24 hours; the deposited cream of tartar is separated by filtration, washed with ether, dissolved in boiling water and titrated with solution of potassa. The *free tartaric acid* is found by neutralizing 10 c.c. of the wine with solution of potassa, adding 40 c.c. of wine, and treating 10 c.c. of this mixture as for cream of tartar. The quantity of potassa solution used must be calculated for 10 c.c. of the original wine.

Determination of Tannin.—The method of Löwenthal as modified by Neubauer is used. The alcohol is first removed from the wine, the latter is then brought to the original volume and is titrated with permanganate of potassium and indigo carmine. There being other substances that reduce the permanganate in wine, the tannin and coloring matter are removed by shaking with purified animal charcoal, and the liquid is then titrated as above.

Acetic Acid is determined, according to the method of Kissel-Neubauer, by adding baryta water to 50 c.c. of the wine to faint alkalinity, evaporating the alcohol, filtering from precipitate, adding phosphoric acid to the filtrate, and distilling repeatedly. The distillate is then titrated.

Sugar is determined by Fehling's method in the wine which has been decolorized by animal charcoal. The presence of alcohol does not interfere.

Glycerin is determined by evaporating, according to the method of Neubauer-Reichardt, 100 c.c. of the wine to one-third, adding slaked lime to alkalinity, and evaporating to dryness. The residue is exhausted with boiling 90 per cent. alcohol, the solution evaporated to dryness, again dissolved in alcohol and treated with ether. The precipitate is separated by filtration, and the filtrate evaporated spontaneously to dryness.

Nitrogenous Constituents are determined by the method of Will-Varrentrapp for the estimation of nitrogen.

The Ash is determined by evaporating 50–100 c.c. of the wine to dryness in a platinum capsule, drying and heating to low redness. The constituents of the ash are then determined as usual.

QUALITATIVE EXAMINATIONS.

The methods for the determination of *coloring matters* are too numerous to be mentioned. *Potato-starch, grape-*, and *cane-sugar* are determined by polarization.

Salicylic acid can be determined only in wine free from tannic acid. The latter is insoluble in bisulphide of carbon, whilst salicylic acid, though with difficulty, is soluble in that liquid. The wine is shaken with an equal volume of bisulphide of carbon, and this is tested with ferric chloride.

Sulphurous acid is determined by distilling about 3 c.c. from 50 c.c. of the wine, observing to cool the receiver well. The distillate is treated with nitrate of silver, which gives a white precipitate, soluble in nitric acid. The determination of the presence of *inosite* is important, because it is present in all natural wines. At least half a liter of wine is precipitated with acetate of lead, filtered, and treated with subacetate of lead. The precipitate is washed, suspended in water, decomposed by H_2S, and the filtrate evaporated to syrupy consistence and treated with four times its quantity of absolute alcohol. The residue (insoluble) remaining after 24 hours, is dissolved in water, decolorized with animal charcoal, and evaporated to dryness. If *inosite* is present this residue will produce a rose-red color on addition of one drop of mercuric nitrate solution. *Arsenic*, which may be introduced by coloring matter, *lead*, *mercury*, and zinc, are detected in the usual way.—Schweiz. Wochenschr. f. Phar., No. 17, 1882, pp. 149–153.

Wine—Detection of Logwood.—When a solution of logwood is treated with peroxide of manganese, it becomes brown, and this brown liquid, by the action of zinc and hydrochloric acid, gives a colorless solution of hæmatoxylin; this may be detected by the ordinary reagents for that substance, alkalies and their carbonates giving a blue-violet coloration; calcium hydroxide a red-violet; bichloride of tin or molybdate of ammonium in a solution slightly acid with nitric acid, a violet coloration. A. Pizzi has taken advantage of this reaction for the detection of logwood in wines; 20 c.c. of wine are agitated with 2 grams finely powdered binoxide of manganese, and the brown liquid is treated with zinc and hydrochloric acid, the decolorized solution is then divided into several portions, and tested with the reagents named. The author has examined wines to which other red coloring matters have been added, and although these yielded brown solutions with binoxide of manganese, the reduced solutions did not give the hæmatoxylin reactions. Brazil-wood is the only one which has any analogy with logwood, but here also there are differences. The author is investigating a method for distinguishing it from logwood.—Jour. Chem. Soc., August, 1881, p. 761, from Gazz. Chim. Ital.

Wine—Estimation of Potash.—In order to determine the potash in wine, R. Kaiser proceeds as follows: To 100 c.c. of the wine (clarified by charcoal) 7 grams of hydrated carbonate of sodium, and 2 grams of tartaric acid are added, and finally 150 c.c. of alcohol of 92 per cent. The mixture is then allowed to stand for 24 hours in order to separate the potash as acid tartrate; this is collected on a filter, washed with alcohol, and then dissolved in water and brought to a known volume. It is then titrated with decinormal soda solution.—Jour. Chem. Soc., March, 1882, p. 336; from Chem. Centr., 1881, p. 706.

Wine—Determination of the Extent of Plastering.—To determine the extent of plastering which the wine has undergone, and which is permitted only to the extent that not more than 2 grams of sulphate of potassium shall be contained in the liter, Jay proposes that 5.9695 grams of chloride of barium are dissolved in 900 c.c. of water, and 20 c.c. concentrated hydrochloric acid having been added, the whole is made up to a liter. 20 c.c. of this solution are equivalent to 2 grams K_2SO_4 per liter when 50 c.c. of the wine are employed. If on the addition of 20 c.c. of the reagent to 50 c.c. of the wine the whole of the sulphate is not precipitated, then the wine is to be rejected.—Jour. Chem. Soc., January, 1882, p. 96; from Bied. Centr., 1881, 574.

Wine—Determination of Alum and Gypsum.—According to Louvet, 200 c.c. of wine are evaporated to dryness, incinerated and ignited, and the ash fused in a platinum crucible with 3 grams of carbonate of sodium, whereby the lime, magnesia, and ferric oxides are converted into insoluble carbonates. The mass is dissolved in water and the solution filtered. As the solution may contain aluminate of sodium, it is acidified with hydrochloric acid, treated with a large excess of carbonate of sodium, and the alumina collected on a tared filter. The filtrate contains all the alkaline bases. The insoluble portion of the fused mass containing the chief portion of the aluminium is fused with a few grams of pure soda, and digested several times with water. The solutions are mixed, and treated for aluminium as above. The precipitate is collected on the tared filter previously used, after being washed several times with distilled water by decantation. It is then dried, ignited, and weighed. The gypsum is determined by Marty's method. The wine is evaporated, the residue is ignited, and the ash treated with very dilute nitric acid. The mixture is then filtered, precipitated with chloride of barium, and weighed as sulphate of barium.—Jour. Chem. Soc., January, 1882, p. 96; from Chem. Centr., 1881, p. 252.

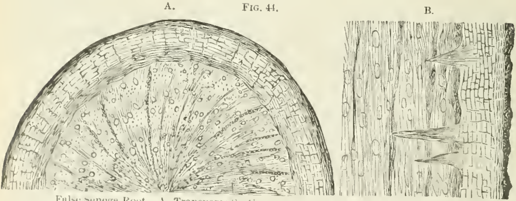
SAPINDACEÆ.

Euphoria Litchi, Desf.—(*E. Punicea, Lamarck*).—Stanislas Martin describes the fruit as being 10 cm. in circumference and 12 cm. long, fleshy, the seed with a hard testa, the embryo exalbuminous, hard. The arillus is covered with rough and sharp projections, weighs 35 cgms., is brittle, contains tannin and brown resin, burns with flame, and leaves little ash. The pulp of each fruit weighs 2 to 3 gms., and contains much sugar, pectin, mucilage, tartaric acid, and an aromatic principle. Professor Maisch observes that litchi fruit is used in China and India, in febrile diseases, for its refrigerant acidulous properties.—Am. Jour. Phar., September, 1881; from Bull. Gén. de Thérap.

POLYGALACEÆ.

Senega—False and True—Characters of Distinction.—Mr. George Goebel draws attention to a false senega, which, under the name of "Southern Senega," has been lately introduced and sold in place of true senega. The false senega, as met with in commerce, is a root varying from a yellowish to a lightish brown color, surmounted by a knotty head or crown displaying numerous stem-scars. Below this crown is found the root proper, which is from three to six inches in length, irregularly branched, cylindrical, tapering, longitudinally wrinkled, and breaks with a short fracture, displaying a brittle and readily removable bark, which constitutes about one-fifth of the bulk of the root. It is difficult to reduce to powder on account of the hardness of the woody portion, the powder being sternutatory and of a very light straw-color. The drug, when masticated, causes coughing and a very painful sensation in the fauces. Efforts to trace its exact habitat or procure a plant have, so far, proven fruitless. It corresponds with the Polygala examined by Mr. Greenish (see Proceedings, 1879, p. 214) and pronounced by him to be true senega, young and immature; but this view Mr. Goebel regards as erroneous, since all true senega, whether old or young, has the characteristic keel-like projection and the irregularly-formed woody tissue.

Fig. 44.

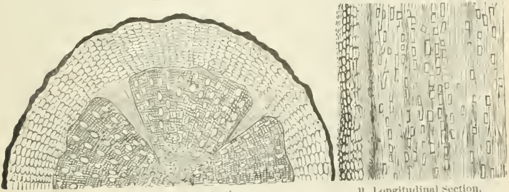


False Senega Root.—A. Transverse Section. B. Longitudinal Section.

The false senega (see Fig. 44), when cut transversely, exhibits an outer layer of cells, rather irregular, very compact, thin, and corky; the inner bark is about five or six times as thick; its cells are very regular, and appear in distinct circles, varying in size; the outer circle is formed of very small, flattened cells; the second, broader layer, consists of oval cells, and is followed by a zone of smaller, slightly flattened cells, and by an inner circle of cells nearly similar to the preceding. A very thin cambium layer separates the bark from the wood, which is rather compact, with slightly curved numerous medullary rays, composed of small, flat, parenchyma-cells; the woody cells are small, somewhat oval-shaped, intermixed with large ducts of the same shape, arranged in three distinct circles. In longitudinal section, the corky layer of the bark is rather irregular; in the next layer the cells are long and flattened, followed by somewhat larger oval cells, and then by long, flattened, very compact liber, cells, and by the thin cambium. The wood is composed of prosenchyma tissue, with large ducts.

The true senega (see Fig. 45), when transversely cut, exhibits a bark with a very thin, corky layer, and which consists of hexagonal cells, forming three layers, the cells of the inner layer being much smaller in size. Inside of the thin cambium layer is the radiating, woody portion, composed of wood-cells and hexagonal ducts, arranged in straight lines, occasionally in pairs, and about four times as large as the adjoining cells. In the longitudinal section are seen the thin, corky layer, the somewhat loose-celled middle bark, the dense inner bark containing elongated cells, the thin cambium, and the compact wood with large ducts.

Fig. 45.



Senega Root.—A. Transverse Section. B. Longitudinal Section.

Both varieties of senega contain polygalic acid; but, while the true senega yielded 5 to 5.25 per cent. of the acid, false senega only yielded 3 per cent. This inferiority is also shown in the various preparations—decoction, infusion (B. P.), fluid extract, syrup, compound syrup, and tincture (B.P.)—made from the two drugs; those of the false senega being much lighter in color, and having the peculiar taste of senega less prominently than those made from true senega.—Am. Jour. Phar., July, 1881, pp. 321–325.

Referring to the paper of J. U. and C. G. Lloyd, read at the meeting of the Association last year (see Proceedings, 1881, p. 453), Professor Maisch observes that the evidence presented in that paper that what he has called *false senega* is really derived from *Polygala Senega* is very strong, and the facilities enjoyed by the authors of examining drugs in large quantities are such that their statement regarding the large size of this senega root is doubtless correct. Yet, although he has been supplied with samples from perhaps twenty different parties, he has seen it only of about the same size as ordinary senega, and never unusually large. On the other hand, he has seen only one specimen of the root of *Polygala Boykinii*, and, although this is smaller than ordinary senega, it agrees in its histological relations so well with the so-called *false senega* that it might well be collected for the latter *if attaining the same size.* Indeed, the uniform development of the woody centre and the absence of the inner bark tissue, forming the keel, is so constant that it may be questioned whether a plant with such a strikingly different root will not show other differences—aside from the width of the leaves—which may entitle it to be ranked as a species rather than as a variety. It is important, therefore, that the roots of well-authenticated species of the American Polygalas should be subjected to a careful histological examination.—Ibid., October, 1881, p. 486.

Polygala Boykinii, Nutt.—Occurrence and Therapeutic Value.—Dr. J. H. Gunn draws attention to a plant abounding in Central Alabama, which Dr. Laurence Johnson has identified with *Polygala Boykinii*, Nuttall. Dr. Gunn has found it to have the virtues of *P. Senega*, which it resembles in everything except a few slight differences in botanical character.—New Rem., July, 1881, p. 208.

Polygala Boykinii, Nutt.—Source of "False Senega."—Professor John M. Maisch has identified the root of this plant, which was furnished him by Dr. Gunn, with the false senega above described by Mr. Goebel, and previously by Mr. Greenish. The same root has been noticed at different times, among others by Mr. William Saunders (see Proceedings, 1876, p. 661), who also noted its deficiency in acridity. Professor Maisch describes the plant as an herbaceous perennial. Several slender stems are produced from the same root (which is entirely destitute of the keel-like line so characteristic of *P. Senega*), and rise to the height of 12 or 18 inches without branching. The leaves are in whorls of about five, attain a length of about an inch, and vary between lanceolate and obovate in shape, the upper ones being even linear and sometimes alternate. The flowers are in terminal, slender, rather dense spikes, and are of a whitish color, with roundish partly green wings. The seeds are hairy and have a caruncle of about two-thirds the length of the seed. The plant flowers from May or June to July or August, and grows in rich calcareous soil in Georgia and Florida, and westward.—Amer. Jour. Phar., August, 1881, p. 387.

PAPAVERACEÆ.

Poppy-Heads—Constituents.—Mr. T. B. Groves draws attention to the fact that he has found codeia to be a constituent of poppy-heads as long ago as 1854, and that subsequently (in 1865) he found, besides morphia and narcotine, which are with meconic acid mentioned as constituents, also narceia. Good specimens, obtained by him at that time, were exhibited at the last year's meeting of the British Pharmaceutical Conference.—Yearbook of Phar., 1881, p. 408.

Opium—Cultivation in the Himalayas.—Captain I. F. Pogson, in a recent communication to the Agricultural and Horticultural Society of India, expresses the opinion that "British India, with its varied and fertile soils and climate, is capable of producing sufficient opium of all kinds to supply Europe, Asia, Africa, Australia, and all America. The demand for first-class opium, for medicinal purposes, increases daily, and though the Himalayan cultivators are able to produce it, no effort is made to throw this most valuable description of opium into the London market. The Bunneahs have the entire poppy cultivation and opium trade in their hands, and the practical result is their enrichment and the hopeless impoverishment of the cultivators.

"The following is given as an example on a large scale: In the British Himalayan province of Kishteewar, miles and miles of land are annually placed under poppy culture. The very large quantity of first-class opium which results is sent or smuggled into China *via* Ladak and Thibet, and thus a leak of perhaps not less than 50 lacs of rupees is steadily taking place in neglected and unknown portions of opium-producing British territory. The Thibet and Hindoostan road begins at Kalka, and the tracing ends at Shipkee, on the Chinese frontier. A road, such as it is, connects Kishteewar with the valley of the Sutlej in Kunawar (Upper Busahir), and so joins the Thibet road line. Now, if a regiment of pioneers were sent to Kishteewar to open out and improve the existing road, and another half regiment of pioneers were sent to open the road to Shipkee so as to fit it for mule traffic, the opium of Kishteewar, produced under the superintendence of an opium agent, could be sent to Shipkee, and a regular frontier trade in opium and merchandise established between British India *via* Simla and China. Of course every inducement and facility should be offered to Thibetan and Chinese traders to visit Simla, and as it is perfectly legitimate for the government of India to convert an illicit intra-Himalayan opium trade with Thibet and China into a legitimate traffic, all parties concerned would be benefited, and the government especially so.

"The Kishteewar poppy cultivation would be taken out of the Bunneahs' hand, and all the Zemindars released from their thraldom. The production of first-class medicinal opium for export to Europe and America would speedily follow, and as such opium should be sold at a government opium mart. to be established at Umritsur, the representatives of London firms would purchase readily and largely an opium rich in morphia and other valuable medicinal alkaloids extant in superior opium, but deficient or entirely absent in the opiums of Bengal and Behar. Captain Pogson considers that it is quite possible for the Indian opium revenue to be increased to twelve millions sterling from its present figure, leaving Malwa opium duty out of the calculation."—New Rem., October, 1881, p. 320; from Mag. of Phar.

India Opium—Distinction in Cases of Poisoning.—Mr. Kanny Loll Dey, who as chemical examiner for the government has had good opportunities for observation, states that in all cases of poisoning by opium (which in India are usually suicidal) the presence of "porphyroxin" can be determined if India opium has been used, whilst this never occurs when the poison used is Smyrna or Turkey opium. The presence of porphyroxin is indicated by the addition of diluted hydrochloric acid and application of heat to the product obtained by the usual modified process of Stas, when a rich purple color is developed. He thinks this test alone sufficient to detect the presence of Indian opium, which alone is used in opium-poisoning cases in India.—Phar. Jour. Trans., November 12th, 1881, p. 397.

Opium—Influence of Mould on Alkaloidal Strength.—When incompletely dried opium is preserved in well-closed vessels it is very liable to form mould (*Mucor mucedo* and *Aspergillus glaucus*) which, under circumstances, has by C. Bernbeck been found to permeate the entire cake. Experiments have proved that the formation of mould does not occur if water is present up to 12 per cent., but that it will always take place if the amount is above that figure. He has found that the formation of the mould has the effect of gradually reducing the morphine strength of the opium. A sample containing 21.5 per cent. moisture, and, when dry, 10.36 per cent. morphine, was placed in a well-closing tin canister. After three months the whole was permeated with fungous growths, and analysis of a dried sample showed the presence of only 9.87 per cent. morphine. Three months after that the strength had been reduced to 9.59 per cent.—Phar. Ztg., August 13th, 1881, p. 487.

Opium—Restoration of Moisture.—Mr. Adolph G. Vogeler observes that opium which has become dry and hard may be restored to its original condition of moisture by cutting it into pieces as small as possible, placing the pieces into a rather large porcelain capsule, and the capsule into a larger vessel containing some water, and, after covering the latter vessel, heating it over a brisk fire. After the generated steam has thoroughly penetrated and moistened every particle of the opium, the apparatus is allowed to cool, *without removing the cover*, else the opium is liable to become hard again on the surface. When cold, or nearly so, the mass is well kneaded and finally formed into a cake. The opium will become darker in color, but its odor remains unimpaired.—The Pharmacist, July, 1881, p. 244.

Opium—Morphia Strength.—Dr. E. R. Squibb has collected the assays of eight lots of moist commercial opium, all of the crop of 1879 to 1880, comprising 181 cases, and finds that they average 10.25 per cent. of pure morphia, corresponding to 12.35 per cent. when calculated for dry and powdered opium. The minimum yield was 9.6 per cent., the maximum 11.1 per cent. Much of this opium, if not all, was below the average market grade for medicinal uses, and was sold at low prices to makers of morphia salts. The average of 141 of these cases, calculated for dried and powdered opium, was not less than 12.65 per cent., while the 50 cases of poorer grade opium would yield a powdered opium of 11.6 per cent. morphia strength. That these percentages, though quite satisfactory from a pharmacopœial standpoint, are still below the average of the market, is shown by an assay of 8 samples of powdered opium purchased from the largest wholesale drug houses of Philadelphia and New York. These yielded, respectively, 15.1, 14.5, 14.4, 14.3, 14.0, 13.9, 12.5, and 9.5 per cent. of pure morphia, being an average of 13.52, notwithstanding that the last-mentioned sample (9.5 per cent.) was badly adulterated with dextrin. Dr. Squibb is of the opinion that the Pharmacopœia should limit moist opium to contain not less than 9 per cent., nor more than 15 per cent. of morphia by the officinal process of assay. Also, that a powdered opium should be introduced into the Pharmacopœia, to contain not less than 14, nor more than 18 per cent. of pure morphia. He thinks that such powder would fluctuate between 14 and 15 per cent. of pure morphia. The apparently higher grade of commercial opiums, while due in a great measure to the operations of the present drug law, which rejects opium containing in its moist condition less than 9 per cent. of morphia, is also due to the improved processes of assay; former processes having failed to determine the percentages of morphia correctly. Among the different processes proposed, Dr. Squibb recommends a

Modification of Flückiger's Process for the Assay of Opium; which he gives in minute detail, so that pharmacists who may be unaccustomed to such work may be induced to try it, and of which the following is an outline: 10 grams of the opium are weighed into a tared flask, of 120 c.c. capacity, with 100 c.c. of distilled water; the whole is well shaken, and allowed to macerate for about twelve hours, with occasional shaking. The magma is transferred to a filter of about 10 cm. diameter, and, after draining, carefully washed with water to make 120 c.c. of filtrate, which is set aside. The residue on the filter is returned to the flask, shaken with 30 c.c. of water, again transferred to the filter, the flask washed twice with 10 c.c. of water, and after this has been passed through the filter, the latter is washed with 20 c.c. of water, making thus in all, 70 c.c. of second filtrate. This is evaporated to 20 grams, the first filtrate is added, and the whole again evaporated to about 20 grams. When cool, 5 c.c. of alcohol is added, the mixture stirred, and, if clear, poured into a tared 100 c.c. flask. The capsule is rinsed with 5 c.c. of water, in small portions, and, if filtration was not necessary, 5 c.c. more of alcohol are added. If the liquor has been filtered, however (in which event it is necessary to wash the filter and to evaporate the filtrate and washings to 25 or 30 grams), then 10 c.c. of alcohol must be added. Now add 30 c.c. of ether, shake well, add 4 c.c. of solution of ammonia, specific gravity 0.960, and shake the flask vigorously until crystals begin to separate. Set the flask aside in a cool place for twelve hours; then pour off the ethereal stratum, as closely as possible, on to a tared filter of about 10 cm. diameter, well wetted with ether; add 20 c.c. of ether to the contents of the flask, rinse around without shaking, and again pour off the ethereal stratum as closely as possible. Wash the filter with 5 c.c. of ether, and allow to drain and dry. Pour on the remaining contents of the flask, rinse the flask twice with 5 c.c. of water, dry the flask and weigh it. The increase in weight over the original weight of the flask is adhering morphia. Wash the filter and crystals with 10 c.c. more of water, drain, express gently, dry at 100° C., and weigh. Remove the crystals of morphia, brush it off, reweigh it, and deduct the tare from the gross weight. The remainder, added to the crystals in the flask, give the total yield of morphia.—Ephemeris, No. 1, 1882, pp. 2–21.

In a subsequent paper ("Ephemeris," No. 2, pp. 55–56), Dr. Squibb communicates the results of assay of four cases of apparently higher grades of opium, as follows:

Morphia. Per cent.	Insoluble residue. Per cent.	Water. Per cent.
10.8	28.4	24.6
10.8	31.3	23.6
9.8	24.7	23.6
9.9	24.8	17.7

Calculated for dried and powdered opium, the powder would assay 14.4, 14.1, 12.9, and 12 per cent. of morphia. The opium, therefore, while unusually good in appearance did not contain a corresponding amount of morphia. The small amount of insoluble residue, particularly in two of the cases, leads the author to the inference that some soluble matter has probably been added to improve the appearance of the opium; and this is supported by the fact, that private reports have been made to the effect that a new diluent for opium was being used in Asia Minor, by which the appearance was improved, and once or twice this new diluent was reported to be strained fig-paste.

In a third paper ("Ephemeris," No. 3, 1882, pp. 82–83), Dr. Squibb records the results of some further assays, undertaken with a view to determining, if possible, the character of the higher and lower grades of powdered opium with which the New York market is supplied. He had procured for this purpose, samples of powdered opium from four houses known to be engaged in a pretty sharp competition for the cheaper trade of the market, and found them to yield respectively, 11.4, 12.2, 13.4, and 13.4 per cent. of morphine, the average being 12.6 per cent. These were, therefore, all made from moist opium containing over 9 per cent., and the result shows that it is difficult to obtain in the New York market, powdered opium containing less than 9.5 per cent. of morphia—the strength found in the adulterated sample quoted from the author's previous paper. Dr. Squibb has also assayed two cases of Salonica opium, of the crop of 1880, with the following results:

	Morphia. Per cent.	Water. Per cent.	Residue. Per cent.
Case No. 1, . . .	14.34	18.11	34.0
	or 17.51 per cent. if calculated for powdered opium.		
Case No. 2, . . .	16.78	17.23	27.33
	or 20.27 per cent. if calculated for powdered opium.		

The morphia was more colored than usual, and the results may, therefore, be a little too high.

Opium—Estimation of Morphine.—While many good methods are given for the estimation of morphine in opium, Dr. P. E. Alessandri believes the following to be the most expeditious of all: Digest 5 grams of powdered opium in 80 c.c. of a 3 per cent. solution of oxalic acid in a percolating apparatus, passing the solution through the opium twice over, using an additional 20 c.c. of the oxalic acid solution for the final washing. The whole is then divided into two equal parts, and each portion is treated with hydrate of barium to slight alkaline reaction. The precipitates are allowed to deposit, the supernatant liquids decanted, and the precipitates transferred to and washed on filters with water to which alcohol has been added. The nearly dry precipitates are removed from the filters, and one is shaken with 90 per cent. alcohol and the other with ether. The ethereal solution yields the narcotine, the alcoholic solution the morphine and other alkaloids on evaporation. The process may be modified, but as described yields exact results.—Pharm. Journ. Trans., June 3, 1882, p. 994, from L'Orosi, V, p. 1.

Opium—Rapid Analysis.—Messrs. Portes and Langlois recommend the following new process for the rapid determination of morphine in opium: Take from an average sample 7 grams of opium; weigh out 3 grams of slaked lime, and measure 70 c.c. of distilled water. Mix the opium and the lime very carefully, adding the water in small fractions, and leave the mixture for half an hour, stirring from time to time. Throw the whole upon a filter, and collect 53 c.c. of the liquid in a small glass provided with a lid. Add to the liquid 10 c.c. of ether, and agitate. Dissolve in the liquid 3 grams of chloride of ammonium, agitate to promote solution, and let settle for two hours. Decant the ether, replace it by a fresh quantity, and decant again. Collect the precipitate of morphia upon a filter without folds and 10 cm. in diameter, and wash the precipitate and the vessel with a few c.c. of cold water. Wash the precipitate into the vessel which has served for precipitation by means of 50 c.c. of distilled water, add 5 c.c of dilute sulphuric acid, containing 1.617 per cent. by measure (? Rep.) of SO_4H_2, and 4 drops of neutral litmus. If the liquid becomes red, the opium does not contain 10 per cent. of morphine, but if it is blue, it exceeds the normal standard. To find the deficiency or the excess, it must be neutralized with standard alkali or acid.—Chem. News, February 10, 1882, p. 67, from Jour. de Phar. et de Chim. November, 1881.

Opium—Colorimetric Assay.—Among the different processes for the assay of opium, Mr. C. Schneider finds the colorimetric method proposed by Stein in 1871, and which depends upon the decomposition of iodic acid by morphine, to be most convenient, and at the same time quite accurate and economical. The process, somewhat modified by Mr. Schneider, is as follows: 0.1 gram opium is mixed with 0.2 gram sulphate of copper, moistened with a few drops of diluted sulphuric acid (1 : 5), boiled with about 100 c.c. of distilled water, allowed to cool, and brought to the exact measure of 100 c.c. If the opium contains 10 per cent. of morphine, 6 c.c. of this liquid must contain 0.0006 gram of morphine. A standard morphine solution of this strength is prepared for comparison, by dissolving 0.01 gram of pure morphine by the aid of a few drops of diluted sulphuric acid in 100 c.c. of water. If 3 c.c. of the standard morphine solution are introduced into a tube with 0.06 gram of crystallized iodic acid and 2 to 3 drops of concentrated sulphuric acid, and the mixture is then shaken with 3 c.c. of pure chloroform (free from alcohol), the chloroform will assume a distinct red color. By repeating the experiment with the opium solution, the greater or less intensity of the color will readily determine the strength of the opium, the experiment being repeated with larger or smaller quantities of opium solution until the chloroform assumes a color identical with that produced by the standard solution of morphine. Mr. Schneider finds that the addition of concentrated, or even dilute, sulphuric acid is not necessary, and that the reaction readily takes place without it. He therefore recommends the modification of the process to that extent.—Arch. d. Pharm., August, 1881, p. 87–92.

Chelidonium Majus, Lin.—Reputed Value of the Root in Phthisis.—Mr. Charles O. Thiebaud draws attention to several cases in which celandine roots were supposed to have cured incipient as well as developed pulmonary consumption. He has learned of many instances, well authenticated, of the very good effects of the drug. The manner of using it in his neighborhood (Vevay, Ind.) is as follows: Two or three ounces of the fresh root is put in a pint of whiskey and allowed to macerate for a week; a teaspoonful is then taken as required—about three times daily. Mr. Thiebaud says: "Whenever threatened with cough we now take the celandine."—Am. Jour. Phar., December, 1881, p. 624.

Macleya Cordata, R. Br. (Bocconia Cordata, Willd.)—Alkaloidal Constituents.—Professor J. F. Eykman communicates the results of investigation of this Japanese plant, which has previously been unstudied. The plant is known in Japan as poisonous, and grows almost everywhere upon hills and mountains in uncultivated spots. The hollow stem of the (perennial) herb grows to a height of more than one meter; the leaves are up to 30 cm. long. On puncturing the stem, veins of leaves, or fruit, an orange-yellow, milky juice exudes. The small flowers are arranged in a large panicle, and consist of two white sepals, many hypogynous stamens, and an ovary which grows to a lancet-shaped fruit of 2 cm. in length and 1½ cm. in thickness. The seeds are small, and have a red color. The root is about 5 cm. thick, and, on cross-section, is seen to have a red color near the periphery. It flowers in July.

The root and leaves, assayed with Mayer's solution, appear to contain about the same quantity of total alkaloids as Chelidonium majus. Two alkaloids were found, the one *sanguinarine*, which appears to be contained in largest quantity in the fruit; the other the author has named

Macleyine, which is interesting on account of its close resemblance, if not identity with the rarest of the opium series of alkaloids, *protopine*. The author gives the method of extracting the new alkaloid from the root, and the following description: *Macleyine* is almost insoluble in water and alkalies. On adding ammonia to an aqueous solution of its salt, and filtering, the filtrate separates after awhile into wart-like crystals. It is scarcely soluble in cold, a little more soluble in boiling alcohol; also very little soluble in ether, except when freshly precipitated; very little in cold benzol, more so in boiling. Chloroform, especially when warm, dissolves it tolerably well. Macleyine has no pronounced taste, but its salts have a bitter, afterwards sharp and cooling taste. When crystallized from chloroform or ether, or precipitated by alkalies and dried by exposure to air between blotting-paper, the alkaloid is obtained anhydrous. Analysis led to the formula $C_{20}H_{19}NO_5$. The agreement of the observed properties of Macleyine with those observed by Hesse for protopine covered the characteristic globular or warty form of the substances when separating from ether, their solubility in different menstrua, their ultimate composition, the composition of their platinum salts, and other properties of the salts. In other respects the agreement is nearly as close as in the former, though the slight differences may be owing to accidental circumstances. The author does not claim that the identity is proven, but thinks it has been rendered highly probable. If they should prove identical, however, macleyine would be the first alkaloid of the papaveraceæ identical with one extracted from opium, and would form an additional proof of the chemical relationship of papaver with the other papaveraceæ. The analogies which may be traced between sanguinarine and some of the alkaloids of opium, though not at present to be depended on, at least justify the supposition that a more exact study of the papaveraceæ will show the alkaloids existing in them to be either identical or isomeric with those of opium, or to form new members of the homologous (or isologous) series.—New Rem., June, 1882, pp. 163, 164; from the author's pamphlet, entitled "Beitrag zur Kenntniss der Papaveraceen-Alkaloide," Yokohama, 1881.

VIOLACEÆ.

Viola—Occurrence of Salicylic Acid in Several Species.—Carl Mandelin has isolated crystallized salicylic acid from the herb of Viola tricolor, var. arvensis, by preparing from 90 pounds of the fresh herb the aqueous extract, treating this with alcohol, evaporating the alcohol, agitating the remaining liquid with ether, treating the residue from the evaporation of the ether with hot water, again agitating with ether and recrystallizing from hot distilled water.

Three other varieties, including one cultivated, were found to contain salicylic acid in the free state and none in combination. It varied between .043 per cent. in the cultivated plant and .107 per cent. in the variety arvensis, calculated for the air-dry herb. The root, stem, and leaves contain a comparatively large amount of salicylic acid, the petals only a small quantity, and the leaves only a minute trace of it in the free state, but an apparently larger quantity in combination. Reactions indicating the presence of a little free salicylic acid were also obtained with the rhizome of Viola odorata, Lin.; V. silvatica, Fr.; V. palustris, Lin.; V. canina, Lin., and V. arenaria, D. C. The leaves of V. odorata yielded salicylic acid only after boiling with dilute hydrochloric acid. The acid was not detected in V. uliginosa, Schrad.; V. mirabilis, V. uniflora, V. floribunda, and V. pinnatifida, Lin.—Amer. Jour. Pharm., January, 1882, p. 10; from Inaugural Dissertation, Dorpat, 1881.

SAXIFRAGACEÆ.

Saxifraga.—Presence of a new bitter principle, "bergerin," in the stems of different species. See *Glucosides*, under "Organic Chemistry."

CUCURBITACEÆ.

Squirting Cucumber—Cultivation in Lincolnshire.—According to Mr. E. M. Holmes, about 2 acres of squirting cucumber are under cultivation at Market Deeping. As might be expected from its habits, the seeds sow themselves, being frequently projected 12 to 20 feet. The young plants bear transplanting. Too much wet or cold in spring injures the crops. It is collected from the beginning to the middle of July, the fruits being collected whilst still green, but of full size; when they begin to turn of a pale or whitish tint they will no longer bear handling. The juice is first strained from albuminous matters through a sort of swan'sdown material, stretched on an oblong frame, such as is used for collecting precipitates. It is then allowed to settle and the sediment collected in fine linen and allowed to drain in shallow trays, perforated with holes about ½ inch apart, and with drainage-furrows between the holes. A bushel of the fruits, whether sliced or bruised, yields only from ¼ to ½ ounce of elaterium.—Pharm. Jour. Trans., September 17, 1881, p. 239.

TURNERACEÆ.

Damiana.—Mr. Ign. Urban draws attention to this aphrodisiac, and gives a careful description of the plants yielding the true drug, viz., *Turnera aphrodisiaca* and *T. diffusa*, accompanied by numerous illustrations. The subject has been exhaustively treated in former reports, and need not, therefore, be extracted for this. The botanical descriptions being in Latin, the original paper is available to many who are not familiar with German.—See Archiv d. Pharm., March, 1882, p. 187 201.

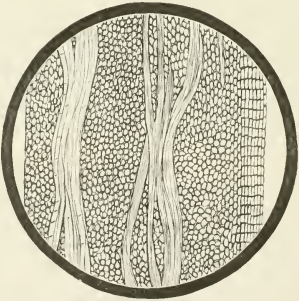
ROSACEÆ.

Amygdalus Communis—Cultivation in California.—In a thesis recently presented to the California College of Pharmacy, Martin J.

Murphy states that almonds are grown in most parts of that State, and that considerable loss was caused by frost in districts unsuited to the culture. The almond tree does best in the coast mountain valleys in the central and southern parts of the State, where they are protected from the frosts and cold winds, and are supplied with atmospheric moisture. The variety best suited to the climate is the Languedoc, which is a late bloomer and thrifty grower. About one hundred trees are planted to the acre, yielding fruit when three years old of an average value of $50; four years, $200; five years, $500; six years, $1000; seven years, $1500; eight years, $2000, older trees bearing more fruit. The average price of sweet almonds is 14 cents, and of bitter almonds 10 cents per pound; the latter are not cultivated to any great extent in California. The bleaching process, employed for giving the almonds uniform appearance and for destroying insects, consists in burning sulphur upon trays on which the almonds are placed. In three experiments the author obtained from California bitter almonds 39.5, 34.0, and 32.7 per cent. of fixed oil (by expression?).—Amer. Jour. Phar., April, 1882, p. 175.

Rubus Villosus—Microscopic Structure of the Root-Bark.—Mr. Chester Johnson gives a description of the plant and particularly of the root-bark and its microscopic structure. A longitudinal section (Fig. 46) of the bark shows the fibrous structure or bast tissue, which makes it very tough and strong, although it can be torn in the direction of the fibre with comparative ease. The cross-section (Fig. 47) presents

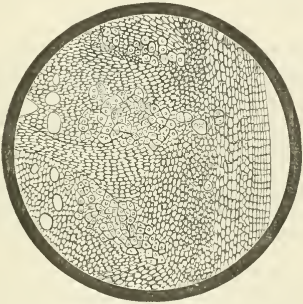
FIG. 46.



Rubus Villosus.—Bark of the Root, Longitudinal Section.

the medullary rays, and the wedge-shaped bundles of bast tissue. The epiphlœum consists of about six or seven layers of tabular cells, and the meditullium is quite porous from the numerous ducts. The bark is found in commerce peeled from the inert woody portion. It is of a gray-brown color externally, and of a darker brown in the intermediate layer, and slightly wrinkled. The root itself varies from the one-eighth of an inch in diameter to the thickness of the little finger. —Amer. Jour. Pharm., December, 1881, pp. 595, 596.

FIG. 47.



Rubus Villosus.—Bark of the Root, Transverse Section.

Sorbus Aucuparia, L.—Yield of Malic Acid from the Fruit.—Mr. Edwin Johanson has determined the quantity of malic acid in the fruit of the European mountain ash at different periods of its growth. The results have uniformly shown that the fruits contain their maximum of acidity when partly ripe, the fully ripe fruits containing less malic acid than those collected when they begin to turn in color. The results are shown in the following table, the percentage being given both for the entire fruit and for the expressed juice:

Date.	Appearance of the Fruit.	Percentage of Acid in entire Fruit.	Percentage of Acid in Juice.
July 18.	Green-yellow, wax-yellow, some reddish,	5.4 per cent.	6.5 per cent.
July 25.	Wax-yellow, many reddish,	6.25 "	7.9 "
Aug. 2.	Reddish-yellow, and yellowish-red,	6.6 "	8.2 "
Aug. 12.	Orange-red and handsome light brick-red,	5.85 "	7.5 "
Aug. 19.	Completely red,	5.00 "	6.5 "
Sept. 1.	Color of ripe fruits,	4.92 "	6.2 "

The fruits were collected from the same tree. The large percentage of malic acid leads the author to suggest these fruits, which are obtainable in abundance, as a source for malic acid, which, in its turn, should be used for making pure ferric malate as a substitute for that uncertain preparation "extractum ferri pomatum."—Schweig. Wochenschr. f. Pharm., Nos. 10 and 11, 1882, pp. 87, 95; from Pharm. Zeitschr. f. Russl., No. 1, 1882.

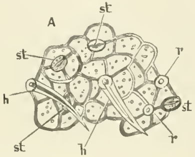
LEGUMINOSÆ.

Senna—Microscopic Characters and Identification.—The purchase of powdered drugs in preference to powdering is becoming so prevalent, that it becomes very desirable to establish their microscopic characters of recognition. Dr. W. Lenz observes that this has been done in the examination of many commercial powders, particularly of spices, by Wiesner, Vogel, Müller, and others, but that many of the more important medicinal substances have been neglected, or their microscopic characters have been too indifferently described for their certain identification when in the condition of powder. He has therefore determined the prominent microscopic characters of distinction of *senna leaves*, in the hope that others may be induced to work in a similar direction.

Preliminarily Dr. Lenz remarks that for the examination of a vegetable powder it is necessary to have exact knowledge of all, or at all events of their characteristic cell and tissue forms of the plant or part of the plant. For this purpose a clear idea of the anatomical structure must first be obtained by the examination of sections of the whole drug, before proceeding to the examination of the powder prepared from the same. As soon as the examiner is able to recognize and determine each cell-form in the powder, and can assign to it its proper place in the unpowdered drug, he is prepared to examine the powder of commerce. The characters of identification which are thus determined will not only serve as a basis for all subsequent examinations of the commercial powders of the same drug, but also for its identification in admixtures. After alluding to the particular difficulties in establishing characters of distinction in the case of leaves in general, the author proceeds to give the following microscopic characters of

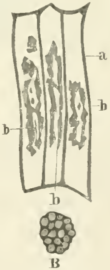
Folia Sennæ Alexandrinæ.—The drug examined consisted of the dry leaflets of *Cassia lenitiva*, Bischoff, and was free from argel leaves. The leaflets are somewhat leathery, oval oblong, or oblong lanceolate, uneven at the base, broadest in the middle, short acuminate, pale greenish, with a bluish glimmer both on the upper and under surfaces, and on the latter provided with fine hairs, particularly in the region of the midrib. The epidermis (Fig. 48) shows the same structure on the upper and on the under surface, but the thick-walled, one-celled hairs (*h*), which are each inserted in a group of 4 to 6 cells of the upper epidermis, are on the under surface somewhat more profuse. These hairs are straight, or bent, simple, the tube nearly as thick as the walls; they are brittle, and easily break at near the base, forming characteristic scars (*r*). Along the midrib isolated hairs are found, which are up to five times as long as those shown at *h*, and are thin-walled. The stomata (*st*), which are as a rule surrounded by a ring of 2 to 4 epidermal cells, occur on both surfaces with like frequency. The epidermis consists of a single cell-layer, which is developed somewhat stronger on the upper than on the under surface, the two layers together occupying about one-third the diameter of the leaf. Contrary to the general rule the palisade tissue (several cells of which are shown by Fig. 49) lies immediately beneath the upper and lower epidermis. This

FIG. 48.



Cassia Lenitiva.—Epidermis of leaf; *h*, hairs; *st*. stomata; *r*, insertion of broken hair.

FIGS. 49, 50.



Cassia Lenitiva.—Palisade cells of leaf; B, × 144, end view; F, lateral view. *a*, cell-wall; *b*, dry contents of cells.

tissue is also composed of a single layer of cells, but the cells immediately beneath the upper epidermis are appreciably larger than those near the under epidermis; both layers together occupying more than one-third of the diameter of the leaf, the contents of the large cylindrical palisade cells (Fig. 49 *b*), standing with their long diameter vertical to the surface of the leaf, are peculiarly shrivelled, so that they may be taken for thickened cells. The palisade tissue therefore presents, when superficially examined, the appearance of a layer of stone cells (Fig. 50). The centre of the leaf is traversed by a profuse network of vessels, composed of fibres, spiral and scalariform vessels, and parenchymatous tissue, which are not particularly characteristic. Neither are the large roundish cells of the fundamental tissue very characteristic; their strongly shrivelled granular contents strike the eye, while the delicate cell-walls are noticed with difficulty.

Alexandria senna of commerce, containing generally more or less of leaf-stalks and fruits (husks), it is necessary to become familiar also with the microscopic character of these. The epidermal cells of the stalk (Fig. 51) are considerably narrower (elongated in the direction of the stalk), than those of the leaf-epidermis, and have few hairs and stomata. The parenchymatous tissue (Fig. 52), which specially distinguishes the stalk, has nearly the cell-form of ordinary corkwood. The epidermis of the fruit resembles that of the leaf in a remarkable degree, but the cells of the upper epidermis are somewhat more elongated than those of the leaves. The most characteristic part of the husk, however, is a tissue, traversing the fleshy portion parallel to the walls, which consists of several superimposed layers of long, not thickened, acuminate tubular fibres, which are in each layer closely disposed in the same direction, while the fibres of the different layers cross each other at right angles, as shown by Fig. 53. This characteristic tissue is always found in the powdered Alexandria senna if it contains any fruits at all, and is easily recognized even by the inexperienced observer. With a microscope of moderate power, however, only two of the layers are observable.

FIG. 51.

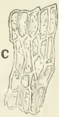


FIG. 52.

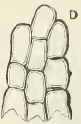
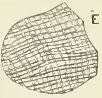


FIG. 53.



Cassia Lenitiva.—× 144—C, Epidermis of petiole; D, parenchyma of petiole; E, middle layer of fruit-pulp from flat side.

In examining the commercial powder it is best to exhaust it with boiling 90 per cent. alcohol, and, thus freed from resin, it is then examined microscopically under glycerin. The elements of the vascular bundles are then shown very prominently; the palisade tissue is characteristic, but particularly so the fragments of the epidermis. Owing to the abundance of hairs on genuine Alexandria senna, the powder contains a correspondingly large quantity of them, and the fragments of the epidermis, even when the hairs have broken off, readily show the characteristic points of insertion. Frequence of strong vascular bundles, composed of large spiral vessels, points to an article containing much leaf-stalk. The frequent occurrence of husk fragments points to a powder made of a common sort of Alexandria senna. The fleshy portion of the fruit, underlying the epidermis and outside of the fibre layer, is not unlike the large-celled parenchymatous tissue of the stem; that lying within is composed of larger cells, and possesses more nearly the type of a true fruit flesh; the cellular layer, constituting the inner wall of the fruit, shows no characteristics. Elements of the tissues of the small seeds have not been found.

Folia Sennæ Tinnevelly.—The anatomical structure of these leaves does not differ materially from that of Alexandria senna. The epidermis, however, is far less hairy, and the hairs do not break so easily as in the case of Alexandria senna. Hence powdered Tinnevelly senna contains fewer hairs and the epidermis fragments rarely show the characteristic points of insertion of the hairs (Fig. 48 *r*). The elements of the vascular bundles, also, are not as prominent in the Tinnevelly variety, and they appear to be richer in spiral vessels than in the case of Alexandria senna.

Experiments were also made to determine the amount of moisture, resin and cellulose in the leaves of both varieties. The Alexandria variety contained 11.29 per cent. of water, 18.76 per cent. resin, and 10.52 per cent. cellulose. The Tinnevelly variety contained 9.60 per cent. of water, 19.09 per cent. of resin, and 11.59 per cent. cellulose.—Arch. d. Phar., February, 1882, pp. 106–113.

Copaiba—Examination of Commercial Samples.—Dr. E. R. Squibb has had occasion to examine four samples from large parcels of copaiba, the appearance of which was very much against its quality in every sample, and its quality was disputed. On subjecting them to distillation the four doubtful samples gave, respectively, 46.2, 51.5, 40.5, and 43.5 per cent. of oil, whilst a sample of good Para copaiba, examined for a standard of comparison, gave 56.1 per cent. of oil. The best authorities state that copaiba should contain 40 to 60 per cent. of oil, and the doubtful samples were, therefore, within the range of this quality. The author remarks that copaiba does not distil easily in a glass vessel, and that it should be distilled in a small metal still, first with ten times its volume of water, and then twice successively with five times its volume.—Ephemeris, No. 3, 1882, p. 86.

Copaiba—New Chemical Analysis.—With respect to the constituents of Maracaibo copaiba balsam the statements existing in chemical literature are considerably at variance, partly in regard to the properties of the therein contained terpene, and partly in view of the crystallizable resinous acids and amorphous resins which may be obtained therefrom. An investigation of Brix, performed in the University laboratory of Barth, at Vienna, which had for its object the elucidation of these differences, confirms in most respects the statements of Strauss (1868).

The Maracaibo balsam contains accordingly a hydrocarbon of the composition $C_{20}H_{32}$, which furnishes no crystallizable compound with hydrochloric acid, and by oxidation with the chloric acid mixture yields acetic and terephthalic acid. By the treatment of the crude terpene with sodium, there results, after the distillation of the colorless oil, upon further distillation a beautiful dark-blue oil, which, in thicker layers, is scarcely transparent, but in thinner layers shows a beautiful violet color. This body is a hydrate of the oil, and corresponds to the formula $3(C_{20}H_{32}) + H_2O$. Phosphoric anhydride converts it again into the original terpene. Besides the latter there exists in the Maracaibo balsam a brown hard resin, soluble in alcohol and ether, a yellowish hard resin, sparingly soluble in alcohol, more readily in ether, and melting at 85° C., an amorphous, tough, soft resin, and a cystallizable acid, although in so small an amount that its probable identity with the metacopaivic acid of Strauss could not be definitely established. The extremely small amount of the latter found by Brix, in the balsam examined by him, as also the previous statements of Bergmann, Buchheim and Bernatzik, who could obtain no crystallizable acids at all, renders the existence of the latter as belonging to the integral constituents of the Maracaibo balsam somewhat problematical.

The product which is furnished by the German chemical manufactories as metacopaivic acid and copaivic acid, is not obtained from copaiba balsam, but from gurjun balsam, and is not identical with Werner's gurjunic acid, which, according to Strauss, is the same as metacopaivic acid. Both of the products which occur in trade melt at 126° to 129° C., dissolve in ether and alcohol, even that of 80 per cent., and are precipitated from the alcoholic solution by water in the form of beautiful, long needles, with a silky lustre. Although the obtained formula agrees perfectly with that of copaivic acid, $C_{20}H_{30}O_2$, as determined by the analyses of Rose and Hess, yet its want of solubility in ammonia, as also of all acid properties, excludes its identity with the copaivic acid of older authors. The successful obtainment of an acetyl product points to the rational formula $C_{20}H_{28},OH_2$.—Am. Jour. Phar., May, 1882, p. 219; through Pharm. Zeitung, No. 16, p. 116, 1882, from Sitzungsberichte d. Acad. d. Wiss. zu Wien, No. 6, p. 459, 1881.

Peru Balsam—Detection of Adulteration.—According to A. Senior, the specific gravity of Peru balsam varies from 1.138 to 1.147, and samples of a lower sp. gr. than 1.138 are to be regarded as suspicious. The consistence of the adulterated sample is usually such as to yield "thick, threadlike, attenuated drops." The quantitative determination is only of use in such cases when the adulterants tend to increase the weight of benzyl cinnamate, which should amount to about two-fifths or one-half of the total weight of the balsam. To estimate the cinnamic acid, 50 parts of the balsam are boiled for two hours with 20 parts of lime and 500 parts of water, water being added from time to time to replace that lost by evaporation. The mixture is then filtered, the residue twice washed with 200 parts of hot water, and the filtrate acidulated with excess of hydrochloric acid and left to cool, when cinnamic acid crystallizes out; this is collected and dried between filter-paper, and finally at 90°. The weight of acid ought to be 3 or 4 per cent. of the original sample. The condition of the residue affords an important indication of the purity, as pointed out by Flückiger (see Proceedings, 1881, p. 215). The benzyl cinnamate may be determined by shaking the balsam with bisulphide of carbon, evaporating the solution,—which will be nearly colorless if the balsam be pure,—and weighing the residue.—Jour. Chem. Soc., January, 1882, p. 112; from Analyst, 6, 204.

Peru Balsam—Test of its Purity.—A. Doescher proposes to digest 2 grams of the balsam with 10 grams of petroleum benzin, and to evaporate 30 drops of the clear benzin solution upon a watch-crystal. Pure Peru balsam leaves a colorless oily residue, which on being mixed and gently heated with 5 drops of commercial nitric acid, acquires a yellow color. If the balsam be adulterated with 10 per cent. of storax, the residue on treatment with HNO_3 turns greenish-blue, and finally dirty green-yellow; the same color, but clearer, is obtained with a balsam containing 10 per cent. of colophony. If Grote's test be applied (agitating 3 drops of the balsam with 2 c.c. of officinal ammonia water), the sample containing rosin yields an emulsion with thick and lasting foam, and gradually becomes thick, mostly gelatinous. The emulsion-like mixture from the balsam containing storax has a thin, rapidly disappearing foam, and does not become thick or gelatinous.—Am. Jour. Phar., July, 1881, p. 361; from Phar. Ztg., 1881, p. 238.

Licorice Root—Production in Spain.—Mr. H. C. Marsten, U. S. Consul, in his report to the State Department, gives some interesting information regarding the production of licorice root in Spain. The following is culled from an abstract of that report in "New Rem." (January, 1882, p. 16): The licorice plant grows wild in the lower lands, in marshy ground, and on the banks of rivers. Probably the best quality obtained in Spain is found in the provinces of Aragon, Murcia, and Toledo. The very best Spanish licorice root is found near the margin of the Ebro, in Aragon. The next in point of quality is obtained near Cordova. Where it once takes root it is almost impossible to eradicate it. It grows in many countries, and varies in quality according to soil. Spanish licorice differs quite materially in the several provinces, the principal variations being that in some parts the bark is red, brown, or light-colored, the inside varying from light yellow to brown; the proportions of sugar and starch vary also. Many kinds are fibrous, while others are almost as hard as wood. The ground is pulled at intervals of three, four, or five years, according to circumstances, by digging trenches, pulling everything visible as long as possible until it breaks. After a year or two it shows above the ground with a little stem; in the spring, over this stem there are flowers. From the time this stem appears, until the flowers have fallen off, this root is not in condition to extract, for the sap does not return to the root until then. Each year, till the ground is culled, the quantity of roots and tops increases, until the ground is unfit for cultivation of any kind. It is from September till March that the root is gathered, and goes through a process of drying or curing before it is considered marketable. The value of this root does not admit of its being increased in crop by cultivation, and the quantity gathered depends greatly upon the severity or mildness of the winter. If severe, it lessens the quantity gathered. Again, if other crops are good, labor being scarce, less root is gathered.

Abrus Precatorius—Examination of the Seeds.—Dr. C. J. H. Warden has undertaken the examination of ruttee seeds,—used in India for cattle-poisoning,—but has not yet succeeded in isolating the active principle. The chemical examination has, however, resulted in the separation of a crystalline acid, an oil, and a certain extractive. The acid, which the author has named *abric acid*, is white and crystalline, and has a composition corresponding to the formula $C_2H_{24}N_3O_4$. It is slightly soluble in cold, but dissolves in boiling water, and crystallizes out in delicate white microscopic needles. With alkaline bases it forms well-defined crystalline salts, which, like the acid itself, are inert. From the experiments made it would appear that the seeds, in the form of emulsion, produced poisonous effects, that from one-half a seed (which weigh on an average two and three-sixteenth grains) producing fatal effects when injected into the thigh of a cat, but that a temperature of 100° C. destroys the activity of the poison.—Chem. News, January 13th, 1882, p. 13.

Psoralea Corylifolia, Roxb.—Value of the Seeds in Leucoderma.—Kanny Loll Dey, Rai Bahadoor, draws attention to the value of the oleo-resinous extract of the seeds of *Psoralea corylifolia*, Roxb., in the treatment of white leprosy (leucoderma). The oleo-resin is applied diluted with simple unguents, and has been found so efficacious that he advocates their introduction into the British Pharmacopœia. The cure is almost certain in children and adults if the application be continued for some time, but in persons of advanced age, say after forty years, it is tedious. The plant is a native of various parts of India, and is commonly found in the vicinity of villages during rainy and cold seasons. It is annual, erect, from 3 feet to 4 feet high. Leaves simple, rarely ternate, ovate-cordate, scallop-toothed; stipules recurvate. Racemes long-peduncled. Bracts three-flowered. The seeds are somewhat ovate, very small, and of a dark-brown color, and possess an aromatic bitter taste.—Pharm. Jour. Trans., September, 1881, p. 257.

Jamaica Dogwood—Hypnotic Value.—The use of Jamaica dogwood as a substitute for opium has been highly recommended by those who have investigated its properties. It is more decidedly hypnotic than opium, produces no anorexia, headache, and does not constipate the bowels or interfere with digestion. It acts rapidly, but its effect is less durable than opium, and requires to be given more frequently. The dose is 20 minims of the fluid extract every three hours.—Am. Jour. Pharm., August, 1881, p. 426; from South. Med. Record, 1881.

Soja Hispida, Moench.—Presence of a Peculiar Sugar.—The seeds of this leguminous plant, which are used in India in the preparation of a sauce called soy, were found by A. Levallois to contain a peculiar slightly sweet sugar, which, on precipitation by ether from its alcoholic solution, forms a very deliquescent mass. It does not reduce Fehling's solution, yields glucose on treatment with dilute mineral acids, has a rotary power of about + 115, and after inversion of + 35, ferments readily with yeast, and with nitric acid yields mucic and oxalic acids. In the formation of mucic acid the sugar resembles melitose, and it has also some analogy with cane-sugar.—Am. Jour. Pharm., February, 1882, p. 77; Rép. de Pharm., November, 1881, p. 518.

Medicago Sativa—Substitution of the Root for Belladonna.—See *False Belladonna Root*, under "Solanaceæ."

Urtica Pilulifera—Therapeutic Value.—According to Professor X. Landerer, the seeds of the Roman nettle are collected in Greece, and a decoction of them is an approved medicine for increasing the secretion of milk in nursing mothers. The root is a remedy for chronic cough, which, in many cases, has produced remarkable results. It is called "pilulifera," in reference to the pill-like clusters of fruit. It was called "Knidi" by the old Hellenes, and at present is called "Tsuknida."—Chem. and Drug., July, 1881, p. 293.

Tonka Bean.—Value as a deodorizer for iodoform, which see under "Organic Chemistry."

TEREBINTHACEÆ.

Juglans Nigra—Value in Diphtheria.—Dr. C. R. S. Curtis reports to the Boston "Medical and Surgical Journal" the results of his trials of black-walnut leaves in the treatment of diphtheria. He was led to employ them by reading of Néaton's success with the leaves and bark of the European walnut as a topical application in malignant pustule. Not having access to the European species, he substituted for it a strong decoction of the leaves of the native black walnut in a bad case of diphtheria, to be used as a gargle, and, to his agreeable surprise, with very good effect. Since then he has used the remedy in about thirty cases, many of them bad ones, and all have recovered, a result he is inclined to attribute in great part to the walnut decoction. He has used the remedy in the form of a preventive, in spray with the atomizer, as well as in a gargle. Besides the leaves he employs the hulls of the green walnuts, which make the decoction still stronger, and he finds it not painful or especially disagreeable to his patients.

Walnut Leaves.—Separation and yield of inosite in young and old walnut leaves, and identity of the substance with that obtained from other sources, see Inosite, under "Organic Chemistry."

Mastic—Yield of Ethereal Oil.—The "Pharmacographia" (second edition, p. 164) states that mastic contains a very small quantity of an essential oil. This statement is scattered through chemical literature, although there appears to be no record of any actual experiments. Professor Flückiger has received from Messrs. Schimmel & Co., of Leipzic, a sample of this essential oil, with the information that mastic yielded as much as 2 per cent. The resin, of which a sample was also sent to Professor Flückiger, did not differ from the usual Chian mastic, and appeared to be very fresh.—New Rem., April, 1882, p. 113; Arch. d. Phar., September, 1881.

Sumach—Cultivation in Italy.—An interesting article on the cultivation of the sumach tree, particularly intended for those who desire to engage in its cultivation here, will be found in "New Rem.," June, 1882, pp. 183–184.

Rhus Toxicodendron—Sassafras Oil a Remedy.—Dr. H. Neeson has used a liniment of 15 drops of sassafras oil with 1 ounce of sweet oil (or, better, fresh cream) for several years as a remedy for rhus-poisoning, with invariable success. The affected parts are anointed with the mixture three or four times a day.—New Rem., July, 1881, p. 208.

Chinese Pear-shaped Galls—Distinction from other Rhus-galls.—In a former paper ("Arch. d. Pharm.," vol. ccxiv., p. 524), Mr. C. Hartnich had described a new variety of Chinese galls under the name of "pear-galls." Since then Dr. Wulfsberg ("Jahresbericht d. Pharmacognosie," etc., 1879, p. 49) has expressed the belief that these galls are identical with Japanese galls, which view appears to be also held by Flückiger in the second edition of his "Pharmacognosie." Mr. Hartnich now again draws attention to the subject, and points out the characters whereby this sort of nutgalls may be distinguished, not alone from Japanese nutgalls, but also from the other sorts that are known to be produced by aphides upon different species of Rhus. These distinctions are very characteristic under the microscope, and are as follows:

A Galls smooth, flat, often lobed, with stomata and without resin-ducts: Kakrasinghu-galls, from *Rhus Kakrasinghu*, Royle.

B. Galls more or less pubescent; stomata absent or very rarely present; resin-ducts present.

a. Galls slightly pubescent, always unbranched, roundish-oblong, somewhat plum-shaped, the apex often prolonged into a short point, and this occasionally curved; parenchyma at first tangentially elongated, but beyond the middle of the shell radially elongated; starch-granules unaltered: pear-galls.

b. Galls very pubescent, mostly branched; parenchyma tangentially elongated, internally only isodiametric.

1. Pubescence dense, light-brown; branches numerous; starch-granules unaltered: Japanese galls.

2. Pubescence less dense, greenish-brown; branches less numerous or almost absent; starch pasty: Chinese galls.

The author gives other and particular characters of the new variety of galls, for which reference must be made to the original paper in Arch. d. Phar., July, 1881, pp. 31–34, and Am. Jour. Phar., February 1, 1882, p. 74.

PIPERACEÆ.

Piper Betel, L.—Microscopic Structure of the Leaves.—Dr. H. Paschkis gives the following description of the microscopic structure of the leaves of *Piper Betel, L.:* The upper epidermis consists of three, the under of two layers. Both are composed of polygonal flat cells; but the epidermis of the under side bears very numerous oval stomata, which are distinguished by two or three contiguous cells surrounding the circular guard-cells. The cells of the second and third layers are larger in all their dimensions, but thinner-walled than the uppermost. The latter are covered by a very delicate cuticle. On the under side rather densely, and on the upper side sparsely, are fixed capitate hairs (Fig. 56) of very simple form. These consist generally only of two cells; a stalk-cell, which is pressed down in hour-glass form in a shallow depression of the cuticle, and a somewhat oval capitulum. Some of the epidermis-cells, both in the upper and lower layers, are distinguished by their contents. This consists of a perfectly homogeneous, light-refracting, colorless mass, occasionally quite filling the cell (Figs. 54 and 55). They do not swell up in water, remain unaltered in caustic potash solution, are not dissolved by prolonged boiling in water, strong alcohol or ether, and resist even concentrated mineral acids (sulphuric acid). They are not especially colored by tincture of iodine or tincture of alkanet. In polarized light they do not exhibit any remarkable appearance. These cells have mostly rather much thickened and strongly light-refracting walls, and are distributed irregularly. The reaction indicated silicified cells, which experiments confirmed. The same is shown in *Chavica Siriboa*, Mig., and in *Piper longum*, L.; in *Artanthe elongata*, Mig., a beautiful silicification of the entire hairs, occasionally bordering on the epidermis-cells, is shown; whilst in other species of piper (for instance *Piper longum*, L.), no silicification can be detected. The mesophyll consists, beneath a layer of delicate short palisade cells, of roundish chlorophyll-cells, among which large spherical oil-cells occur densely packed together. These latter are tolerably thick-walled, and have a yellow to brownish contents, which become darkened by caustic potash solution.—Phar. Jour. Trans., July 30th, 1881, p. 85–86; from Zeitschr. Oest. Apoth. Ver.

FIG. 54.

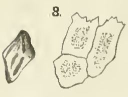


FIG. 55.

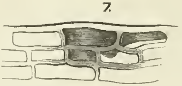
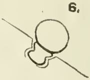


FIG. 56.



Piper Betel.—6. Capitate hair; 7. Transverse section of epidermis, the shaded portion silicified; 8. Isolated silicified epidermis-cells.

CELASTRINACEÆ.

Celastrus Scandens, Lin.—Proximate Constituents of the Bark.—Mr. C. H. Bernhard has made a proximate analysis of the bark, and finds it to contain acid and neutral resin, starch, glucose, gum, a caoutchouc-like body, coloring matter and volatile oil. The ash, 7.52 per cent. of the (air-dry? Rep.) bark, contains sulphuric, hydrochloric, phosphoric, and silicic acids, potassium, sodium, magnesium, calcium, and iron. The powdered bark, when dried for about 4 hours at 200° F., lost 11.62 per cent. A tincture of the bark made with dilute alcohol is unstable, producing a precipitate partly soluble in ammonia and partly in alcohol. Alcohol of 80 per cent. affords a permanent preparation. The infusion and decoction are both unsatisfactory preparations.—Am. Jour. Pharm., January, 1882, p. 1–5.

EUPHORBIACEÆ.

Euphorbium—Supply and Cause of Scarcity.—Mr. John R. Jackson reviews the source of supply of gum euphorbium, drawing his information particularly from consular reports. Large quantities appear to be used, as has been already intimated in the "Pharmacopœia" (1st ed.), as an ingredient in the preparation of a durable and non-corroding paint, used chiefly for painting ships' bottoms, in consequence of the acrid nature of the gum repelling marine animals that would otherwise adhere to the bottoms of the ships. The supply from Morocco being limited, the company manufacturing the paint was at one time compelled to obtain its supplies from species of Euphorbia growing in Natal, but owing to carelessness in collecting, this source has been again redirected to Morocco. Mr. Jackson's review of the consular reports above referred to, leads him to the conclusion, that if a large and regular demand is made known in Entifa, which can best be done through Mogador or Sappi merchants having agents in the city of Morocco, a large annual supply can be relied upon from the district of Entifa alone for many years, though the increased demand and consequent competition of buyers would naturally tend to raise the market price. The species yielding this gum has been proved to be Euphorbia resinifera.—Pharm. Jour. Trans., March 4, 1882, p. 723–724.

Euphorbia Lathyris, Lin.—Physiological Action of the Seed.—This plant, known as caper spurge, is often cultivated as an ornamental plant, and to a certain extent naturalized in the United States. E. Sudour and A. Caraven-Cachin, having observed the effects of the seeds, state that they are drastic purgative, and contain the active principle in very variable proportion. An emetic effect always precedes the purgative action, even if the dose be small, and may manifest itself in 45 minutes, or may be retarded for three hours. The seeds have an irritating action upon the mucous membrane of the digestive canal, principally in the larger intestines, and in the back throat, if mastication has been sufficiently prolonged. The toxic effects produced by large doses may be divided into three periods: 1, the cold stage (vomiting, diarrhœa); 2, the stage of excitation (nervous affects, vertigo, delirium); 3, the stage of reaction (heat, abundant sweating). Opiates are the best and most prompt remedies against these effects. In doses of 6 to 12 seeds, which are recommended in several works, violent gastro-intestinal irritation may be produced. The drug being very active, and frequently variable, should not be employed in medicine.—Am. Jour. Phar., February, 1882, p. 72; from Rép. de Phar., November, 1881, pp. 526, 527.

Euphorbia Villosa—Uses against Hydrophobia.—In the Ukraine and Galicia this plant is said to be regarded as an unfailing remedy against hydrophobia, provided it is taken within 5 or 6 days of the infection. Unusually good evidence seems to be in its favor.—Amer. Jour. Pharm., August, 1881, p. 423, from Allg. Med. Cent. Ztg., through Med. and Surg. Rep.

Johannesia Princeps—Cathartic Value of the Oil of the Seeds.—The fruit of this plant, indigenous to Brazil, where it is called

Anda-assu, weighs about 350 grams and contains 50 seeds, from which 48 grams of a clear, reddish, inodorous sweet oil may be obtained. Taken in doses of 10 grams, four or five evacuations are produced, without any nausea, vomiting, or irritation of the intestines. Compared with castor oil, it is equally active in smaller doses, is more liquid, and has not the disagreeable odor of the latter.—Am. Jour. Phar., October, 1881, p. 495, from Phar. Ztg.

Erimocarpus setigerens—Medicinal Uses.—This plant is extensively distributed in California about the foot-hills and valleys, growing in different soils and flowering through the summer. It is 1 foot or more in height, branched and in tufts, and very woolly and hoary in appearance, the leaves looking almost like white flannel. The flowers are small and inconspicuous and collected in small whorls along the branches. It belongs to the Composite family. Its odor is slight, but to the taste the whole plant is very acrid, particularly the root, the chewing of which leaves an impression on the fauces like that of the well-known Indian turnip. Dr. Henry M. Fiske, of San Francisco, states that old residents and natives in the northern part of the State regard it as a curative in rhus poisoning, and also as highly beneficial in certain pulmonary disorders. For the former purpose it is used externally in the form of decoction. The root is preferred for internal use, and is highly valued in cough and pulmonary consumption. Judging from the active sensible properties of the plant, we think it worthy of investigation. Its anti-rhus reputation is probably due to the fact that a thorough washing of the skin with warm water alone soon after contact with the poison, or at the first appearance of the effect, will very generally prevent or cure, the efficacy of the washing being enhanced by alkaline or saponaceous fomentations, and very probably by impregnating the liquid with herbs of various kinds.—Am. Jour. Pharm., January, 1882, p. 11; from Pacific Med. and Surg. Journ., September, 1881.

Cassava.—A new source for glucose, cultivation, etc., see *Glucose*, under "Organic Chemistry."

URTICACEÆ.

Mulberry Bark—Reputed Tænifuge Properties.—Dr. Bérenger-Feraud has experimented with the fresh bark of the black and white mulberry, taken from vigorous trees in the neighborhood of Toulon, and did not observe any appreciable physiological effect, though giving it, in form of infusion, in doses of 16 to 300 grams. The bark has enjoyed some reputation as a tænifuge since Dioscorides.—Am. Jour. Phar., September, 1881, p. 440; from Bull. Gén. de Thérap.

Cannabis Indica—Presence of a Volatile Alkaloid.—In 1876 Preobraschensky announced that he had isolated nicotine from *Cannabis Indica*, and that he believed this base to be its active principle. Shortly afterwards the correctness of this statement was called in question by Professor Dragendorff and Dr. Marquiss, who pointed out as a possible source of error that the drug might have accidentally contained an admixture of tobacco or some other herb containing a volatile base. In order to throw further light upon this subject, L. Siebold and T. Bradbury made a number of experiments by which they proved that nicotine could be distilled from Indian hemp containing as little as one-half drachm of tobacco in admixture with eight ounces, but that the pure hemp yielded none. Nevertheless, they have isolated, by treatment described, and which is essentially that usually pursued for the isolation of nicotine, a peculiar volatile alkaloid, which was obtained finally as a varnish-like, dry mass, and which they propose to name, provisionally,

Cannabinine.—The small quantity obtained (about 2 grains from 10 pounds of Indian hemp) prevented a nearer examination of the new base, but its alkalinity, its power to neutralize acids, its reprecipitation from the acid solution by caustic alkalies, and its reactions with platinum perchloride, iodine solution, mercuric chloride, and tannic acid afford collectively the strongest possible proof of its being an alkaloid. It differs from both nicotine and coniine in not being a liquid; from nicotine, in particular, by its markedly different odor, its very slight solubility in water, and the reaction of its aqueous solution with chlorine water (strong white turbidity); from coniine by its reaction with platinum perchloride (pale yellow precipitate, disappearing on boiling, reappearing on cooling), and its odor (resembling that of coniine, but being less powerful and less nauseous).—Yearbook of Pharm., 1881, pp. 453–455.

CONIFERÆ.

Juniperus Phœnicea—Uses in Greece.—According to Professor Landerer, the scarlet fruit of the Cypress juniper is found in the Grecian druggists' shops, and replaces the common juniper berry, which grows very sparsely in a few islands of the Grecian archipelago. The Cypress juniper was called *Arkeftos* and *Arneudos* by the ancients. Equally rare in Greece is the

Juniperus Sabina, whose place is supplied in the drug shops by the leaves of *Thuja articulata*. From the massy roots of this tree furniture used to be made.—Chem. and Drug., July, 1881, p. 293.

Canada Balsam—Early History.—Professor Flückiger, referring to the notice of Canada balsam in Boucher's "Histoire de la Nouvelle France," dated October 8th, 1663, to which his attention was drawn by Mr. William Saunders, of London, Ontario, communicates the result of further researches on the early history of this drug, from which it appears that Marc Lescarbot, who visited Canada in 1606 and wrote, in 1612, a "Histoire de la Nouvelle France," etc., had also noticed its production and described its properties.—See Am. Jour. Phar., December, 1881, pp. 593, 594.

Spruce Gum—Source.—In view of the fact that books of reference in ordinary use are silent on the subject of "spruce-gum," and that "Appleton's Cyclopædia" states it to be the exudation of *Abies canadensis*, Professor E. L. Patch submitted the question of its source to Professor Gray, of Harvard University, who replied that *Abies canadensis* does not yield spruce-gum. He referred the query, however, to another person, who replied that "*Abies nigra*, commonly called black or double spruce, is the tree from which such large quantities of gum are taken. *Abies alba* also furnishes gum, but of far less quantity, though much superior in quality." Subsequently Professor Patch received from New Hampshire specimens of the bark with adherent gum, and specimens of the foliage of the tree furnishing them, which confirmed the above statement.—New Rem., January, 1882, p. 23.

B. Animal Drugs.

Sponge—Cultivation.—A number of dealers in New York are exhibiting sponges that have been grown from cuttings made by the method of Professor Oscar Schmidt, of Gratz. Small fragments cut from the parent sponge under water, and fixed on a sandy bottom by means of skewers, at once commenced to grow. Three years is said to be a sufficient time for the production of marketable sponges. In one experiment abroad, 4000 sponges were raised at a total cost of $50, and the experiment is being repeated successfully at Pine Key on the coast of Florida. One of the dealers referred to shows a sponge thus grown which measures 7 x 8 inches in diameter, and is of excellent shape and quality. This industry bids fair to become a profitable one in suitable localities, and is worthy of attention.—New Rem., November, 1881, p. 321.

Leeches—New Method of Keeping.—Mr. Adolf G. Vogeler recommends the following method practiced in his establishment: Into the small opening of a good-sized unglazed flower-pot is inserted a cork, into which three longitudinal grooves have been cut. This pot, filled with peat, containing the leeches, and tied over with a piece of drilling, stands in an unglazed iron kettle. About once a month this kettle is filled with water, no further attention being required. The peat will always retain a proper degree of moisture, no more water being absorbed than what evaporates from the surface. A leech being wanted, the contents are dumped on a sheet of paper. Good peat not being readily obtainable in a large city, the author, about once a year, boils what he has with an extra addition of water and some permanganate of potassium, 5 to 10 grains to the pound, whereby the earth becomes perfectly sweet again.—The Pharmacist, July, 1881, p. 244.

Leeches—Preservation.—Raymann adds to the water in which leeches are kept an occasional pinch of fine river sand, mixed with an equal part of fine iron filings. By this means the leeches are kept healthy, and the water does not require to be changed frequently.—Chem. Jour., June 16th, 1882, p. 370; from Phar. Zeitschr. f. Russl., 1882.

Cod-liver Oil—Presence of Phosphorus and Iodine, and Inquiry into the Value of the Oil now Produced.—In view of the fact that among the substances used in medicine the oils in general, and particularly cod-liver oil, have most markedly experienced the influence of progress in recent years, the inquiry has suggested itself to Mr. P. Carles whether cod-liver oils now contain the same medicinal principles, or whether the proportions of these have not varied from the disgusting liquids that were sold in pharmacies under that name twenty years ago. As the result of his very elaborate researches, Mr. Carles has come to the following conclusions:

That through improvements in the method of extracting oil from cod's livers the old crude oils have been replaced by improved slightly colored clear oils, having an odor and taste which are not disagreeable, and which can be borne by stomachs that tolerate sardines, anchovies, etc.

That, of these different oils, the modern natural pale oils are in every respect to be preferred to the brown empyreumatic oils.

That, independently of their physical and organoleptic properties, the golden-green virgin oils ought to be esteemed the best, as they are lightest for the stomach, having scarcely any acidity and no acridity.

That all kinds of cod-liver oil contain infinitesimal quantities of iodine, doubtful traces of bromine, and small quantities of combined phosphorus, so that it is difficult to see in any of these elements the cause of the reconstituent tonic action of the oil.

That the active principle appears to reside nearly entirely in the peculiar fatty body itself which is present unaltered in virgin oils.

Finally, that these modern virgin oils constitute a product essentially assimilable, and that their association with another medicine does not injure its tolerance or therapeutic action.—Phar. Jour. Trans., January 21, 1882, p. 604–606; from Répertoire, January, 1882.

Cod-liver Oil—Percentage of Iodine.—It being stated in "Garod's Materia Medica," that cod-liver oil contains 0.05 per cent. of iodine, Mr. M. Mitchell Bird has made some experiments to determine the accuracy of this statement. After numerous trials he found the starch test to be the most suitable. Samples of the oil (5000 grains) were saponified with alcoholic potash; the soap was then incinerated in crucibles, the residue lixiviated, the lixivium concentrated, acidulated with sulphuric acid, and the sulphate of potash removed by filtration. The filtrate (and washings) was then treated with solution of nitrite of potassium and an excess of starch-liquor, and the intensity of color compared with that obtained in solutions of iodide of potassium, of known strengths, under the same conditions. Six samples of oil were then examined, with the following results:

I. Pale Norwegian oil, very little sensitive to cold, pleasant flavor, contained 0.21 parts of iodine in 10,000 = 0.0021 per cent.

II. Pale Norwegian oil of ordinary quality, flavor not quite so delicate as the preceding, and more sensitive to cold, contained 0.18 parts of iodine in 10 000 = 0.0018 per cent.

III. Light-brown Norwegian oil, flavor more decided and less pleasant than the preceding, contained 0.16 part of iodine in 10,000 = 0.0016 per cent.

IV. Light-brown oil, said to be Norwegian, contained 0.16 part of iodine in 10,000 = 0.0016 per cent.

V. Pale Newfoundland oil, very free from smell and flavor, but very sensitive to cold, contained 0.12 part of iodine in 10,000 = 0.0012 per cent.

VI. Light-brown Newfoundland oil, of strong flavor, contained 0.14 part of iodine in 10,000 = 0.0014 per cent.

From these experiments it seems probable that iodine is a constant constituent of cod-liver oil, but that it is not present in quantity at all approaching to 0.05 per cent. as has been stated. It is interesting also to note that the amount of iodine yielded by these oils is in inverse proportion to their sensitiveness to cold.—Phar. Jour. Trans., February 4th, 1882, p. 641–642.

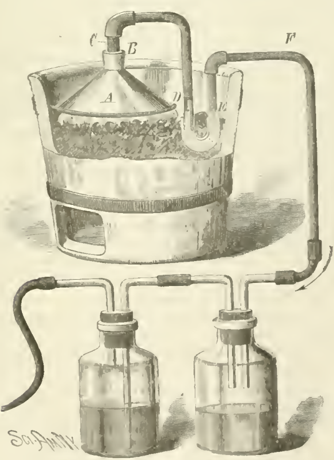
Muskrat Musk—Value as a Perfume.—Mr. Robert F. Fairthorne finds that the musk-pods from the common muskrat, which are obtainable at a small cost, answer a good purpose as a substitute for true musk in perfumery. If 10 or 12 pairs are cut up with scissors into small pieces, and, with the addition of 2 drachms of slaked lime, allowed to macerate for a week or two in a pint of alcohol, a very fragrant tincture is obtained, which he finds at least three times as strong as the tincture or extract of musk generally employed, and is suitable for the most delicate-flavored cologne.—Am. Jour. Phar., August, 1881, p. 397.

INORGANIC CHEMISTRY.

OXYGEN.

Oxygen—Preparation from Common Bleaching Powder.—The following simple and inexpensive apparatus for the preparation of oxygen

Fig. 57.



Apparatus for Preparing Oxygen.

from bleaching-powder is described in "Scientific American," and, as reproduced in "New Remedies" (August, 1882, p. 233), is shown by Fig. 57.

The retort *A* is made of common sheet-iron, doubly lapped and riveted. The short neck, *B*, is slightly flaring, so as to admit of the luting in of a piece of inch steam-pipe. This pipe, *C*, is connected by a screw-cap or elbow with a longer piece of similar pipe, bent somewhat and extending downwards two or three inches below the bottom of the retort, where it is joined by a *U* cap at its lower end, with a third piece of iron pipe extending upward above the bottom line of the retort. A fourth piece of pipe is connected with this latter, at right angles for convenience of attachment to condenser and wash-bottle. The space from *D* to *E* in the tube is loosely filled with fragments of quicklime, each somewhat larger than a pea. Two or three pounds of the chlorinated lime having been put into the retort, the pipe *B* is loosely inserted in the neck and the joint made tight with a stiff luting of clay or plaster of Paris.

The retort is then placed on a charcoal or other moderate fire, the portion of the pipe containing the lime being in the fire. Connection is made with the condenser and wash-bottle as soon as steam begins to come over, and, as soon as the air in the apparatus has been displaced, connection is made by rubber tubing with the gas-bag or reservoir. The moisture in the heated substance first passes off, together with some gaseous matter, the latter being decomposed by the lime; then, as the temperature rises and approaches low redness, oxygen is rapidly disengaged, and, if the fire is good, ten minutes' heating will suffice to exhaust the charge.

The stopcock at bag or reservoir having been closed, the retort may be slipped out, another similar one, already charged, put in its place, and the operation repeated if desired.

The chloride of lime should not be too moist when placed in the retort, or the charge greater than will loosely cover the bottom of the vessel to a depth of one and one-half inches. If a sudden pressure—greater than the delivery-pipe can relieve—is developed in the retort, the luted joint acts as a safety-valve.

The cost of oxygen from bleaching-powder is only about three and one-quarter cents per cubic foot, as compared with nine cents where chlorate of potassium is used, and the gas, after passing through the wash-bottle, is perfectly odorless and nearly pure. An average sample of bleaching-powder (fresh) contains at least twenty-six per cent. of calcium hypochlorite. This substance, when heated to the boiling-point of water, splits up into calcium chloride and calcium chlorate. If the heat is increased to low redness the chlorate is decomposed into calcium chloride and oxygen. But, inasmuch as during the elevation of temperature some hypochlorous acid is apt to pass off, the above-described *U* tube, filled with lime, is interposed, whereby the gaseous acid is arrested, decomposed, and the oxygen from this also liberated. This lime is usually sufficient for two or three charges.

Oxygen—Commercial Manufacture.—It is said that MM. Brin have greatly improved Boussingault's process for the manufacture of oxygen by alternately peroxidizing and re-oxidizing barium oxide. The material employed, after being re-used 400 times, was found not to be deteriorated. MM. Brin calculate on being able to supply oxygen on the large scale at 12 to 15 centimes per cubic meter.—Am. Jour. Phar., May, 1882, p. 214; from Les Mondes and Eng. Chem. News, No. 45, p. 125.

Oxygen—Absorption by Copper.—Mr. W. Hempel has for some time been engaged with experiments on the use of metals at common temperatures as absorbents for oxygen in presence of ammoniacal vapors. This absorption proceeds with rapidity as long as bright metallic surfaces are exposed to a gaseous mixture containing oxygen, but ceases or becomes very slow as soon as appreciable quantities of oxides are formed. He has, therefore, examined if it is possible to effect complete absorption by using carbonate of ammonium as a solvent for the oxides formed. Experiments proved that oxygen was quickly and completely absorbed in contact with copper and a solution of commercial sesquicarbonate of ammonium, but that appreciable quantities of carbonic acid were evolved. Complete absorption of oxygen without the development of any gas was effected if it was exposed tó metallic copper and a solution consisting of equal parts of a saturated solution of commercial sesquicarbonate of ammonium and a dilute solution of ammonia at 0.930. Such a liquid has a tension which may, in most cases, be disregarded, and if the apparatus contains a sufficient quantity of copper it is able to take up 24 volumes of oxygen.—Chem. News, June 30th, 1882, p. 287; from Zeitschr. f. Anal. Chem., xx, No. 4.

Active Oxygen—Production of Hydrogen Peroxide.—Moritz Traube has summarized the results of a lengthy investigation upon the development of active oxygen as follows:

1. Palladium charged with hydrogen, when shaken up with water and oxygen (air), yields immediately and abundantly hydrogen peroxide, a matter which has been hitherto overlooked.

2. The oxidizing action of hydrogenized palladium in the presence of oxygen and water arises not directly from the palladium itself, but almost exclusively from the hydrogen peroxide developed.

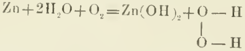
3. In one case only is the oxidizing action of hydrogenized palladium in the presence of water and oxygen different from that of hydrogen peroxide. While hydrogen peroxide does not turn a mixture of potassium iodide and starch blue, hydrogenized palladium and

oxygen bring about a rapid change to blue color. This is because the palladium in this case brings about a transfer of the oxygen from the hydrogen peroxide to the potassium iodide.

4. Contrary to the views of Hoppe-Seyler, I have found that nascent hydrogen is not able to develop active oxygen by splitting the oxygen molecule.

5. The common development of hydrogen peroxide in oxidation processes is no proof of the simultaneous presence of the active oxygen atom, as the peroxide is never formed by the oxidation of water, by means of an active oxygen atom, as has been hitherto assumed. In every oxidation process it results as a consequence of a reduction.

If, for instance, zinc be shaken up with water and oxygen, we obtain, as is known, along with zinc hydrate, hydrogen peroxide. My experiments show, however, that in this case there is no active oxygen formed, and that the molecule of oxygen is not split at all, but rather the molecule of water, the oxygen of which unites with the zinc to form zinc hydrate, while the hydrogen of the water unites with an oxygen molecule to form hydrogen peroxide, as follows:



$$Zn + 2H_2O + O_2 = Zn(OH)_2 + \begin{array}{l} O - H \\ | \\ O - H \end{array}$$

Hydrogen peroxide is, according to this view, a compound of an oxygen molecule with two atoms of hydrogen. It may be termed, if we take the analogy of other compounds formed by the taking up of hydrogen, reduced oxygen, and has the same relation to ordinary gaseous oxygen that indigo-white has to indigo-blue.—Am. Jour. Phar., May, 1882, p. 214; from Ber. Chem. Ges., xv. p. 22.

Ozone—Liquefaction.—Messrs. P. Hautefeuille and J. Chappuis have obtained ozone in liquid drops of a deep indigo-blue; this liquid has been preserved for nearly thirty minutes under a pressure of 75 atmospheres, and its evaporation is not very rapid, even under the atmospheric pressure. The liquefaction was obtained by compressing a mixture of oxygen and ozone contained in the cylinder of Mr. Cailletet's apparatus.—Chem. News, May 26th, 1882, p. 233; from Compt. Rend., May 1st, 1882.

Ozone—Action upon Different Substances.—The Abbé Mailfert has studied the action of ozone upon organic matter, upon various metallic oxides and sulphides, and upon salts whose bases are capable of becoming peroxidized. Mercurous salts are all attacked. The nitrate yields mercuric nitrate and a yellow precipitate of tri-mercuric nitrate. The sulphate gives analogous products. Mercurous chloride and bromide yield the corresponding mercuric compounds, mixed with oxychloride or oxybromide. The iodide is attacked very slightly, giving traces of oxyiodide. Silver nitrate, sulphate, chloride, and cyanide all yield black peroxide of silver. Palladium nitrate and chloride are decomposed, yielding the binoxide. Cobalt and nickel sulphates, nitrates, and chlorides are slowly attacked; the protoxides pass into the state of peroxides. All the basic, and many of the neutral, lead salts yield peroxide of lead. The salts of manganese give rise to three kinds of products, a black or brown precipitate, a violet solution, and a brown, reddish, or yellowish solution. Chromium sulphate and chloride yield chromic acid, or, in presence of ether, perchromic acid. Ferric oxide, in presence of potassa, passes into ferrate of potassium.—Chem. News, April 14th, 1882, p. 163; from Compt. Rend., March 27th, 1882.

Mr. Mailfert further observes that sulphurous acid alone is formed by the action of ozone on sulphur if both substances are perfectly dry, but if water is present, sulphuric acid only is obtained. If an alkali is present, a sulphate is formed. With selenium and tellurium, ozone gives, likewise, selenic and telluric acids in the presence of water, neither selenious or tellurious acids being formed. Most, if not all, sulphides are attacked more or less rapidly by ozone, sulphuric acid being formed in all cases, while the metal either remains as sulphate or is separated as peroxide or metal. Formene and ethylene are converted into carbonic, formic, and acetic acids. Acetylene yields carbonic, butyric, and valerianic acids. Benzol and toluol yield carbonic, formic, acetic, and probably other acids of the fatty series; the first-mentioned, also, a dark-brown solid; the latter a brown syrupy liquid. —Ibid., May 12th, 1882, p. 208.

HYDROGEN.

Pure Water—Color.—Victor Meyer has demonstrated that the color of pure water is bluish-green, as follows: Five tubes of thin glass, about 40 mm. in diameter and 1½ meter in length, are connected by means of caoutchouc tubing, forming a tube about 7½ meters long. Both ends of this tube are closed with even glass plates fitted in metal sockets. The latter are furnished with brass nozzles for filling the tube. The tube itself is placed in an exactly horizontal position and covered with a black cloth. Upon looking through the empty tube the field of vision appears perfectly colorless, the cloth and the metal sockets preventing the color of the glass from exerting any influence; directly, however, the tube is filled with distilled water an intense bluish-green color is observed.—Chem. and Drug., April, 1882, p. 165; from Ber. d. d. Chem. Ges., February 27th, 1882. See also Wittstein's paper in Am. Jour. Phar., 1861, p. 509.

Peroxide of Hydrogen.—Preparation by the action of water on *Ethyl peroxide*, which see under "Organic Chemistry."

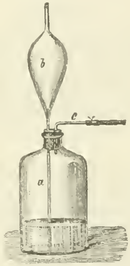
Peroxide of Hydrogen—Technical and Medicinal Applications.—Mr. P. Ebell draws attention to different uses to which peroxide of hydrogen may be put. By its use the ordinary method of bleaching in the sun is completely replaced. It is particularly useful as a bleaching agent for substances of animal origin, such as hair, feathers (particularly ostrich), and silk. The use of H_2O_2 for medicinal purposes has hitherto been restricted because a pure and permanent solution was not obtained at a moderate cost. This difficulty no longer exists. Dilute solutions, when protected from the light, may be kept for months unchanged. It is presumable that the peroxide, similarly to bromine, chlorine, permanganate of potassium, etc., will prove antagonistic to the smallest organism (bacteria), and very favorable results have already been noted in treatment of wounds, particularly in those of a syphilitic, scrofulous, and tuberculous nature. The great advantages that H_2O_2 has over all other disinfecting agents, are: 1. Complete odorlessness. 2. Evolution of oxygen, leaving only water as residue. 3. Absence of deleterious action upon the organism. The solution is at present prepared on a technical scale, and can be furnished cheaply. The methods of preparation are uniformly based upon the oxidizing action of peroxide of barium upon water, and the resulting solutions contain from 3 to 5 per cent. of H_2O_2, and never exceed the latter.—Arch. d. Pharm., March, 1882, p. 208; from Repert. Anal. Chem., and Pharm. Centralh.

Sulphuretted Hydrogen—Modification of Skey's Method of Preparation.—In 1873 (see Proceedings, 1873, p. 274), Mr. William Skey published some interesting observations on the production of sulphuretted hydrogen when a voltaic couple is formed with zinc as the positive and a metallic sulphuret as the negative plate. Mr. P. Casamajor has had occasion lately to apply Mr. Skey's researches to the production of sulphuretted hydrogen from sulphuret of iron, which refused to give it in presence of sulphuric acid diluted with ten times its volume of water, and he believes that the greater part of the sulphuret of iron sold to chemists possesses this resistance to acids. By proceeding as follows, however, he has been able to obtain an abundant supply from any sample of sulphuret of iron.

Enough mercury is put in a bottle to cover the bottom entirely, over this diluted sulphuric acid is poured, and some pieces of zinc are thrown in, which immediately form a zinc amalgam, with great excess of mercury. No action takes place between the zinc and the acid. If, now, a few pieces of sulphuret of iron are thrown in the bottle, they will sink to the mercury, a copious production of sulphuretted hydrogen follows, and will continue with remarkable regularity until either the zinc, the sulphuret of iron, or the acid is exhausted. The mercury is not affected, and does not require to be renewed. Galena, iron pyrites, and copper pyrites, under the same conditions, give off sulphuretted hydrogen very slowly.—Chem. News, July 22d, 1882, p. 44.

Sulphydric Acid—Improved Mode of Using.—G. S. de Capanema communicates the description of a contrivance (Fig. 58) devised by him to effectually saturate a solution with hydrosulphuric acid without the annoyance of the bad odor of the excess of gas. He uses a bottle, *a*, or a flask, to which is fitted a doubly-perforated stopper, pro-

Fig. 58.



Capanema's Apparatus for Hydrosulphuric Acid.

vided with a pipette *b* with a large pear-shaped bulb, and a bent tube *c*, communicating with a hydrosulphuric acid generator. The liquid to be saturated or to be precipitated is introduced in the flask, and the pipette at first drawn up, until the lower end of its tube is above the liquid. Hydrosulphuric acid is now passed until the atmospheric air in the flask and pipette is displaced, and the pipette then pushed down until the lower end of its tube nearly touches the bottom of the flask. The pressure of the gas will force some of the liquid into the pipette. By cautious swinging of the apparatus new portions of the liquid are successively brought in contact with the gas, and, in consequence of its absorption, the liquid in the pipette descends, sometimes with great rapidity. The saturation or precipitation is completed whenever the liquid no longer descends from the pipette. The current of gas is then shut off, the whole briskly agitated, the pipette drawn up, and, when all the liquid has run out, carefully washed with distilled water to free it from any particles of the precipitate which may adhere to it.

If it is desired to prevent the escape of odor entirely, the upper end of the pipette may be provided with an additional tube, charged with a loose pellet of cotton and a quantity of cut filter-paper saturated with solution of acetate of lead.—New Rem., January, 1882, p. 9; from Zeitschr. f. Anal. Chem., 1881, p. 519.

Hydrosulphuric Acid Apparatus.—"New Remedies" (March, 1882, p. 76) describes a form of apparatus (accompanied by an illustration) which is a modification of that originally proposed by Brugnatelli. and which has been recommended for laboratories by Fresenius. The present form is the arrangement used in the University of Marburg, and the particulars of its construction may be consulted as above.

NITROGEN.

Nitrogen—Allotropic Form.—Mr. G. S. Johnson re-asserts that pure nitrogen, free from nitric oxide, when passed with hydrogen over spongy platinum, forms ammonia. If, however, the nitrogen be previously passed through red-hot asbestos no ammonia is formed. This indicates the existence of an active allotropic nitrogen, analogous to ozone.—Chem. and Drug., July, 1881, p. 292; from Proc. Chem. Soc., July 16, 1881.

Nitric Oxide (*NO*)—*Preparation.*—Dr. Edward Johnstone directs to heat gently in an ordinary retort or flask about four parts of the potassium sulphocyanide solution (usually kept for analytical purposes in laboratories) with one part of solution of cobaltous nitrate. Nitric oxide comes off very readily and in large quantities. Instead of the solutions, the above-mentioned salts in the solid form, slightly moistened with water, are equally effective. The equation is somewhat like the following:

$$4KCNS + Co2NO_3 + H_2O = 6NO + C_4 + 2K_2S + CoS + S + H_2O.$$

—New Rem., June, 1882, p. 181; from Chem. News, April 14, 1882.

Nitrous Acid—A New Reagent.—Dr. A. Jorissen draws attention to a new and delicate reagent for nitrous acid, which is based upon the observation, first made by Max Vogel, that when nitrous acid is allowed to act upon an alcoholic solution of rosaniline, the liquid is colored at first a splendid violet, then a fine blue, which passes into a dark green, and ultimately into a reddish yellow. For the purposes of the test the rosaniline is best dissolved in glacial acetic acid (0.01 gram of magenta in 100 c.c.). If 2 c.c. of this solution are placed in a small porcelain capsule, and a trace of solid nitrate of potassium added, the phenomena described by Vogel may be observed. If it is desired to detect a nitrate in a liquid it is concentrated, or by preference evaporated to dryness. For minute traces of nitrous acid the reagent may be diluted with glacial acetic acid (1 : 9). It readily serves for the detection of nitrous acid in natural waters by Fresenius's method.—Chem. News, May 26, 1882, p. 229; from Zeitschr. Anal. Ch.

Nitrites—Detection in Potable Waters.—Mr. Charles Ekins has made some experiments with a view to determining the delicacy of the old-fashioned iodide of potassium and starch-test for the detection of nitrous acid, as compared with those that have been proposed by Griers and, more recently, by Warrington, viz., the metaphenylene-diamine and naphthylamine-tests. The metaphenylene-diamine test gives a distinct reaction in a solution of one part of nitrogen as nitrous acid in 1,000,000 parts of water, and the naphthylamine test will detect with ease one part in 100,000,000, and with care as little as one part in 1,000,000,000. Mr. Ekins now finds that the iodide of potassium and starch-test will give instantly a blue color, which rapidly darkens to a blue black, in water containing one part of nitrogen as nitrous acid in 1,000,000 parts of water; in 10,000,000 a distinct reaction in a few minutes; in 100,000,000 gives a distinct blue in 12 hours, and one part in 1,000,000,000 in 48 hours, and by allowing the solution to stand some days it is possible to detect even smaller quantities than this. This surprising statement gave rise to some discussion, in which attention was drawn to the possibility of impurities in the iodide of potassium (iodate), or in the hydrochloric acid (chlorine), etc., giving rise to the development of the blue color.—Yearbook of Pharm., 1881, pp. 425–432.

Nitric Acid—Artificial Production.—The well-known fact that nitrogen and oxygen in the presence of watery vapor are converted by the passage of the electric spark into nitric acid was established by Frémy and Becquerel with the aid of a Ruhmkorf coil. Since that time electro-magnetic machines have been so greatly improved that the problem of manufacturing nitric acid artificially can now be taken up seriously and with promise of commercial success. According to a Belgian journal, this has been accomplished as follows: The electric spark is made to discharge through a series of closed vessels through which a current of air is passing, whereby red nitrous fumes are produced, which, carried by the current of air, pass up an absorption-tower in which caustic potash solution is descending. Absorption takes place at once, and a tolerably strong solution of potassium nitrate results.—Amer. Jour. Pharm., August, 1881, p. 399; from Mon. Industr., 7, p. 526.

Nitric Acid—Estimation.—Mr. J. West-Knights observes that it is generally supposed that nitric acid in acid solution is only partially converted into ammonia by nascent hydrogen (*vide* "Fresenius's Quantitative Analysis," 6th ed., p. 348), but that he has found that it is quite possible to obtain the whole of the nitric acid present in the form of ammonia, when proper precautions are taken. When a nitrate is dissolved in water in the presence of sulphuric acid and zinc, the N_2O_5 is first converted into N_2O_3, and after prolonged action, the latter is completely converted into NH_3 by the nascent hydrogen. As the reduction, when once started, requires but little attention until completed, the time occupied is of little importance, as the analysis can be left standing all night, and will, in most cases be complete in the morning. After the reduction, the NH_3 can be distilled into standard acid, after making the solution strongly alkaline with caustic soda, and estimated in the usual way by titrating the residual acid with half normal alkali. Before commencing the distillation it is necessary to test the completeness of the reduction; this is best done by adding 1 c.c. of decinormal permanganate solution. If the permanganate is quickly destroyed, nitrous acid is still present, and the reducing action must be continued; but if, on the other hand, 1 c.c. produces a permanent tint, the action may be considered complete. Examples which further elucidate the process are given. See New Rem., February, 1882, p. 52; from Analyst, December, 1881.

SULPHUR.

Sulphur—Improved Method of Extraction.—Messrs. De la Tour and Du Breuil describe a new method for the extraction of sulphur in the Sicilian mines. Its extraction from the mineral by the old method, in the so-called *calcaroni*, is exceedingly crude and incomplete. During the past ten years they have applied a system of heating the mineral in a bath of chloride of calcium, containing 66 per cent. of the salt, thereby securing a sufficient temperature to melt the sulphur, while only from 2 to 3 per cent. remains with the mineral. The apparatus consists of two rectangular tanks, the size of which depends upon the importance of the mine. The tanks are united and lean toward each other to the extent of 10°. When the operation is completed in the one, the boiling solution is transferred to the other tank, which has been previously filled with the mineral. The liquefaction requires about two hours, after which the second tank is emptied, and prepared for the next operation. Both tanks are heated by the same fire. A further economy has recently been accomplished by substituting the mother liquors from the salt-ponds of Palermo, which boil at 120°, for the chloride of calcium solution.—Arch. d. Pharm., March, 1882, p. 224; from Jour. de Pharm. et de Chim. (5), iv, 576.

Sulphur—Specific Gravity.—According to W. Spring, if flowers of sulphur are extracted with boiling bisulphide of carbon, a variety of sulphur is obtained which is insoluble in bisulphide of carbon, and much more stable than the other known varieties of amorphous sulphur. It is a very fine powder, composed of tube-shaped texture; the specific gravity had hitherto not been obtained. Having observed that allotropic bodies assume under sufficiently high pressure the form corresponding to the maximum density of the original body, and that prismatic sulphur—density 1.96—is converted into octahedrons—density 2.06—by subjecting it to a pressure of 5000 atmospheres, Mr. Spring has subjected the above allotropic form of sulphur to a pressure of 8000 atmospheres, whereby it was partially converted into octahedrons. The density of the allotropic sulphur is therefore below 2.06.—Arch. d. Pharm., March, 1882, p. 227; from Ann. Phys. Chem. (Beibl.), 5, p. 853.

Sulphur—Determination in Pyrites.—Mr. F. Boeckmann recommends the following process, which has given equally good results to the methods of Lunge and Fresenius: Half a gram of finely ground pyrites is mixed in a large platinum capsule with the well-known mixture of 6 parts carbonate of sodium and 1 part chlorate of potassium. The mixing is effected with a platinum spatula, and is then made more complete by gently rubbing with an agate pestle fixed to a wooden handle. The whole is then fused over the blast-lamp. The aqueous solution of the melt is first poured into a beaker to avoid spirting, and thence into another tall beaker containing an excess of hydrochloric acid. The filtered solution is heated and precipitated with hot chloride of barium solution, heated gently upon the sand-bath for a time, until the liquid standing above the precipitate has become quite clear, and is filtered at once, etc.—Chem. News, March 3d, 1882, p. 95; from Zeitschr. f. Anal. Chem.

Sulphur—New Reagent.—R. Brunner communicates the following: Mix the substance to be tested for sulphur with some strong solution of potassa, then add a few drops each of commercial nitrobenzol and alcohol, and allow the mixture to stand at ordinary temperature, occasionally agitating. After some time there will appear, if sulphur or alkaline sulphides were present, a reddish color, due to the reduction of the nitrobenzol. By this method not only the presence of free sulphur, but also that contained in albumen, bread, wool, etc., may be demonstrated directly. By inverting the process, and adding pure sulphur instead of nitrobenzol, the presence of the latter body (f. i. in oil of bitter almonds) may be detected.—New Rem., September, 1881, p. 263; from Zeitschr. f. Anal. Chem., 1881, p. 390.

Chloride of Sulphur—Manufacture on a large Scale.—Mr. J. Carter Bell, having occasion to make a large quantity of sulphur chloride, found that the method of preparation usually recommended,—that of passing chlorine over melted sulphur in a retort,—answers well on a small scale, but is impracticable when it has to be made by the hundred-weight. He has, therefore, devised the following method, which requires very little care or attention. Passing over the generation of chlorine, which the author accomplishes in an earthenware vessel from hydrochloric acid and manganese ore, the first important point is to dry the gas perfectly. This he accomplishes by passing the gas first through a three-necked Woulff's bottle, gallon capacity, and provided with a safety-tube, containing sulphuric acid, and then through an aspirator, of 5 gallons capacity, containing small pieces of chloride of calcium. From the aspirator the dry chlorine passes into wide-mouthed bottles of blue glass, fitted with ordinary corks, and filled with dry flowers of sulphur, taking care in the filling that room is left for the gas delivery-tube. When the bottle is full, a hole should be made to the bottom of the bottle, by means of a wooden rod, about three-quarters of an inch in diameter. If this is neglected, and the delivery-tube is pushed down through the sulphur, the tube becomes so filled with hardened sulphur that the gas has not a free passage. Two of these gallon bottles are connected together; the outlet tube of number two may be connected with an absorbing apparatus for waste gases. The apparatus being all connected and gas-tight, the water in the boiler may be raised to boiling heat; chlorine is abundantly given off, and after passing through the acid and chloride of calcium soon begins to act upon the sulphur, which becomes very hot, and abundance of chloride of sulphur is formed, which will be seen in the bottle as a dark-colored liquid with undissolved sulphur at the bottom. When the liquor has reached a strength of 136° Twaddle (specific gravity 1.680), a new bottle of sulphur may be put in the place of number one; when chlorine ceases to be evolved, the spent acid may be siphoned off, and a new charge of manganese and acid introduced.—New Rem., May, 1882, p. 152.

Oxychloride of Sulphur—Formation and Characters.—This new compound has been obtained by J. Ogier by heating together to 250° in a sealed tube, a mixture of equal weights of chloride of sulphur and chloride of sulphuryl. It boils at 60° to 61°, and is readily decomposed by heat. It is a deep-red liquid, of the specific gravity 1.656. Its vapor density taken with Meyer's apparatus is given as 3.98, 3.84, 3.75. The author ascribes to it the formula S_2OCl_2.—Chem. News, March 3d, 1882, p. 98; from Compt. Rend.

Hyposulphite of Sodium—Composition.—In order to ascertain the composition of hyposulphite of sodium, A. Bernthsen mixed the crude product of the action of zinc on sodium hydrogen sulphite with chloride of barium to remove sulphites and sulphates from the solution. By converting the hyposulphite in the filtrate into sulphate, by means of iodine, it was found that 3 atoms of iodine were required to convert 1 atom of sulphur in the hyposulphite into sulphuric acid. The atoms of sodium and sulphur were found to be in the proportion of 1:1; hence the formula for hyposulphite of sodium is $NaSO_2$ or $Na_2S_2O_4$.—Jour. Chem. Soc., July, 1881, p. 508; from Ber. d. d. Chem. Ges., 14, pp. 438–440.

P. Schutzenberger maintains that the true formula for hyposulphite of sodium is $NaHSO_2$. The compound $Na_2S_2O_4$, obtained by Bernthsen, is probably a product intermediate between the bisulphite and hyposulphite, a supposition which is supported by Berthelot's observation, that the development of heat by the oxidation of the hyposulphite takes place in two distinct stages.—Jour. Chem. Soc., August, 1881, p. 682; from Compt. Rend.

Sulphurous Acid—Precaution when Executing the G. P. Test for its Presence in Hydrochloric Acid.—The test consists in placing some chemically pure zinc into a flask containing the hydrochloric acid, and inserting into the mouth of the flask a tuft of cotton which has been saturated with a solution of acetate of lead, when, in the presence of sulphurous acid the cotton becomes blackened. O. Schlickum observes that the purity of the cotton must first be assured. Much of the cotton is now treated with sulphurous acid, a portion of which is retained, though it may give no evidence by odor. He has found such cotton to become blackened when strips of paper saturated with acetate of lead or nitrate of silver remained unaffected.—Phar. Ztg., No. 92, 1881, p. 688.

Sulphuric Acid—Volatility at Ordinary Temperatures.—A contributor to "Il Progresso" states that in operating in an atmosphere which had been dried with sulphuric acid, he found that litmus paper was soon discolored. He attributes this to the volatility of the acid at the ordinary temperature. It has been suggested that the evaporation of the acid may account for the sulphur rays sometimes noticed in Geissler tubes.—Drug. Circ., November, 1881, p. 161.

Sulphuric Acid—Freezing-point at Different Degrees of Concentration.—Professor G. Lunge has made a series of careful experiments on the question of the degree of cold necessary to bring about the formation of crystals in sulphuric acid of different specific gravities. According to Marignac, pure sulphuric acid, H_2SO_4 (frequently called monohydrated sulphuric acid), fuses at + 10.5° C.; the strongest acid obtainable by evaporation or boiling, which contains 98 to 99 per cent. of monohydrated acid at the most, being said to deposit these crystals of monohydrate when cooled to 0° C., although frequently that point is reached without any change whatever. It is known, too, that the common strong sulphuric acid of commerce, that of 66° Baume, which contains 95 to 96 per cent. of monohydrated acid, cannot be brought to solidify even by a freezing mixture. However, the so-called second hydrate, $H_2SO_4 + H_2O$, repeatedly crystallizes at + 8° C., and this often happens in practice. Acids which approximate this composition (the second hydrate contains 84.5 per cent. H_2SO_4, and has a sp. gr. of 1.778 or 63.2° Baumé), when exposed to the frost in winter may burst the carboys.

Professor Lunge has made a series of tests on acids of different strength, using a mixture of three parts ice and one part common salt, in which the thermometer sank to —20° C. The results are appended in tabular form:

Sp. gr. at 50° C.	Degree Baumé.	Freezing-point.	Fusing-point.
1.671	58.	liquid at —20° C.	——
1.691	59.	——	——
1.712	60.05	——	——
1.727	60.75	—7.5°	—7.5°
1.732	61.	—8.5°	—8.5°
1.749	61.8	— 0.2°	+ 4.5°
1.767	62.65	+ 1.6°	+ 6.5°
1.790	63.75	+ 4.5°	+ 8. °
1.807	64.45	—9.0°	—6. °
1.822	65.15	liquid at —20° C.	——
1.842	66.	——	——

—Am. Jour. Phar., February, 1882, p. 68; from Ber. der Chem. Ges., xiv. p. 2649.

SELENIUM.

Selenium—Occurrence in the Argentine Republic.—According to "Les Mondes" (No. 8, 1881), there occurs at Cachenta, in the Province of Mendoza, in the Argentine Republic, an ore containing 28.8 per cent. of selenium, along with silver, copper, lead, iron, tellurium, sulphur, silica, and alumina. The proportion of tellurium is higher than that of sulphur.—Chem. News, July 8th, 1881, p. 24.

Selenium and Tellurium—Occurrence in the Sulphur of Japan.—Professor Edward Divers draws attention to the occurrence of both selenium and tellurium in the sulphur used in certain sulphuric acid works in Japan. The sulphur comes from different parts of Japan,—Kagoshima, Oïta, Hokkaido, etc. The indications are that material quantities of selenium occur in the sulphur, but further experiments are necessary, and their result will be communicated.—Chem. News, November 11th, 1881, p. 229.

New Selenium Compounds—Preparation and Description.—Professors Charles A. Cameron and Edmund W. Davy have succeeded in forming the different selenium compounds noticed below, which have not (as far as they are aware) been previously described.

Neutral Mercuric Selenate, $HgSeO_4$, is prepared by treating freshly precipitated mercuric oxide with selenic acid until a white compound is formed, filtering and evaporating to dryness, and heating to expel free acid. A white salt, obtainable in small crystals by spontaneously evaporating its solution in selenic acid, soluble in sulphuric, nitric, and hydrochloric acid, and decomposed by water into a basic salt and free selenic acid. The

Basic Mercuric Selenate, $HgSeO_4(HgO)_2$, is more readily obtained by precipitating mercuric acetate by a soluble selenate, or by selenic acid. It is a fine red salt, soluble in selenic, sulphuric, nitric, and hydrochloric acids, but requires 10,330 times its weight of water for solution.

Mercurous Selenate, Hg_2SeO_4, is prepared by adding selenic acid, or an alkaline selenate, to mercurous nitrate. It is grayish-white, amorphous, very slightly soluble in water, insoluble in hydrochloric acid, and decomposed by nitric acid with formation of mercuric selenate. It is very sensitive to light, a few moments' exposure causing darkening.

Di-Mercurammonium Selenate $(NHg_2)_2SeO_4 \cdot 2H_2O$, is formed when the neutral, or freshly-prepared and still moist basic selenate, is treated with a strong solution of ammonia, and the solution is then diluted with water, whereby it is deposited as an abundant white precipitate. It is readily dissolved by hydrochloric acid and in strong ammonia, and is blackened by exposure to light.

Mercuric Seleno-cyanide $Hg(CySe)_2$, is readily obtained by adding seleno-cyanide of potassium to mercuric acetate. It cannot be precipitated from mercuric chloride. It forms a white felt-like mass, which must be dried over sulphuric acid at the ordinary temperature. Very sparingly soluble in cold water, much more in it when hot. Freely dissolved by alkaline cyanides, seleno-cyanides, and sulphocyanides, forming double salts. Also in hot solution of mercuric chloride, forming beautiful feathery crystals of the double salt—mercuric seleno-cyanide and chloride—already described by Mr. Crookes.

Mercurous Seleno-cyanide, $Hg_2(CySe)_2$, is prepared by adding a solution of an alkaline seleno-cyanide to one of mercurous nitrate. It is olive-green, and must be dried over sulphuric acid.

The authors also succeeded in obtaining various double salts, which may be briefly noticed.

Potassium Seleno-cyanide and Mercuric Cyanide, $KCySe + HgCy_2$, obtained by mixing strong aqueous, or better, alcoholic solutions of the two salts. The salt has a white silky appearance when dry, and under the microscope is shown to consist of long fine prismatic crystals. Sparingly soluble in cold water or alcohol; more soluble in these liquids when hot.

Potassium Seleno-cyanide and Mercuric Sulphocyanide, $KCySe + Hg(CyS)_2$, is obtained by heating an aqueous solution of potassium seleno-cyanide with mercuric sulphocyanide. The filtrate yields long prismatic colorless crystals, which have similar solubilities to the above double salt. Its solutions give the blood-red reaction of the sulphocyanides.

Potassium Seleno-cyanide and Mercuric Seleno-cyanide, $KCySe + Hg(CySe)_2$, obtained by dissolving the mercuric salt in a solution of potassium salt and evaporating. Long, six-sided prismatic crystals, which are permanent, readily dissolved by cold water and hot alcohol; sparingly in cold alcohol.

Potassium Seleno-cyanide and Mercuric Iodide, $KCySe + HgI_2$, obtained by dissolving mercuric iodide in aqueous or alcoholic solution of seleno-cyanide of potassium, and allowing to crystallize. Pure white, somewhat pearly crystals; sparingly soluble in cold water or alcohol; readily in these liquids when warm.

Potassium Seleno-cyanide and Mercuric Chloride, $KCySe + HgCl_2$, obtained by adding an aqueous solution of mercuric chloride, drop by drop, to an aqueous or alcoholic solution of seleno-cyanide of potassium, as long as the white precipitate at first produced instantly dissolves, when a colorless crystalline salt forms, which remains. A further addition would produce a light-yellow compound, consisting of mercuric seleno-cyanide and chloride. The white salt, which is the compound under consideration, possesses similar solubilities to those above described. It has a faint yellowish tint when perfectly dry. Finally, the

Potassium Seleno-cyanide and Mercuric Bromide, $KCySe + HgBr_2$, is obtained like the corresponding mercuric chloride compound, and has similar properties.—Chem. News, August 5th, 1881, pp. 63–64.

CHLORINE.

Chlorine—Solubility.—Berthelot determined the solubility of chlorine to be, at 12° C., 4 grams of the gas in 1 liter of water; by long-continued action 6 grams of chlorine may be dissolved in consequence of the gradual formation of oxyacids of chlorine. Concentrated solutions of metallic chlorides dissolve much less chlorine than pure water, but the solubility increases with dilution. Strong hydrochloric acid dissolves a much larger amount of chlorine to an orange-colored liquid, with the formation of a hydrogen perchloride, probably of the formula

HCl_3.—Am. Jour. Pharm., November, 1881, p. 574; from Ann. Chim. Phys.

Hydrochloric Acid—Preparation.—On heating a mixture of calcium chloride and magnesium sulphate in the presence of water, basic calcium-magnesium sulphate and free hydrochloric acid are formed: $CaCl_2 + MgSO_4 = (MgO,CaSO_4) + 2HCl$. G. Eschellmann employs this process for the preparation of a pure hydrochloric acid, by heating a soft mixture of calcium chloride and Epsom salt or kieserite with water to dull redness. Magnesium chloride and calcium sulphate give the same result. The basic salt can be used in the manufacture of soda for the liberation of ammonia from sal ammoniac, magnesium chloride and calcium sulphate being formed, from which mixture, on evaporation and heating, hydrochloric acid is produced.

Treated in the above manner, a mixture of chloride and sulphate of magnesium yields hydrochloric acid and basic magnesium sulphate ($MgO.MgSO_4$), the latter of which may be employed for the preparation of magnesia by boiling with water, Epsom salt remaining in solution.—Amer. Jour. Pharm., June, 1882, p. 310; from Chem. Ztg., 1882, No. 13.

Dry Hydrochloric Acid—Preparation.—For the preparation of dry hydrochloric acid, E. Solung recommends to pass a mixture of hydrochloric acid, steam, and other gases into a concentrated solution of chloride of calcium, which retains hydrochloric acid and water. On warming the mixture, dry hydrochloric acid gas is evolved. A simmilar result is obtained by the addition of chloride of calcium to commercial hydrochloric acid, and subsequently heating the mixture. The author also proposes to prepare chlorine and hydrochloric acid from chloride of calcium by heating the latter with silicic acid or silicate of alumina, and passing a current of steam or air over the mixture. The residue is worked up for cement by mixing with clay or lime in proper proportions.—Jour. Chem. Soc., March, 1882, p. 278; from Dingl. Polyt. Jour., p. 242, 287.

Chlorates—Improved Method of Preparation.—If the product of the action of chlorine gas upon milk of lime is decomposed in the ordinary manner with chloride of potassium, then, after the chlorate of potassium has been crystallized out, a part of this salt remains in the mother liquor, and is allowed to flow away on account of the impossibility of separating it out in a state of purity. To prevent this loss, A. R. Pechiney (German patent 15,493) separates the greater part of the chloride of calcium from the chlorate of calcium *before* adding the chloride of potassium. This may be effected in a twofold manner:

1. The solution is evaporated to 92° Tw., when the chloride of calcium crystallizes out; the mass is cooled down to 50° F., and is put

into a centrifugal machine. The liquid run off contains then from one to two molecules of chloride of calcium to one molecule of chlorate of calcium.

2. Lime is added to the solution in the proportion of three molecules of lime to one molecule of chloride of calcium. There are then formed, especially with the aid of heat, basic chlorides, which are separated from the liquid. These two methods may be advantageously used in succession. The basic chlorides, which contain a considerable quantity of chlorate of calcium, are decomposed by warm water, and the solution of chloride and chlorate of calcium is separated from the lime and concentrated till the chloride of calcium crystallizes.

From the solution of chlorate of calcium thus enriched considerably greater proportions of chlorate of potassium may be obtained on adding chloride of potassium than by former processes. In order to obtain chlorate of sodium, sulphate of sodium is added, and the lime remaining in the liquid is removed by the addition of soda. On concentrating the solution, there is deposited first chloride of sodium, which is freed from chlorate by washing.

This method is interesting from a double point of view: it permits the utilization of that portion of chlorate of potassium which was formerly wasted, and it points out a way for obtaining the chlorates of sodium and barium, which are now required in dyeing and printing, and have at present to be obtained from the chlorate of potassium by tedious and expensive methods. Chlorate of baryta might easily be prepared from the chlorate of lime, by adding chloride of barium and separating by crystallization.—New Rem., February, 1882, p. 42; from Chem. Zeitung.

BROMINE.

Hydrobromic Acid—Preparation.—Mr. William Gilmour reviews the processes of Fothergill, of Wade (see Proceedings, 1877, p. 245), and of Squibb (Proceedings, 1878, p. 354). The first is intended to contain hydrobromic acid corresponding to 10 grains of bromide of potassium in the fluid drachm (equivalent to 11 per cent. of acid); Wade's acid represents 15 grains of bromide in the fluid drachm (16 per cent. of acid); while Squibb's process is stated to yield a product containing 34 per cent. of hydrobromic acid. The latter Mr. Gilmour finds to be practically correct; but the specific gravity of such an acid is not 1.274, as stated by Squbb, but 1.300. He recommends this process, with some slight modifications, as the one best adapted to secure a uniform preparation. From it, dilutions corresponding to Fothergill's or Wade's acids are readily made.—Chem. and Drug., August, 1881, pp. 339–340.

Hydrobromic Acid—Preparation.—Mr. Frederick W. Fletcher, after reviewing the various processes for the preparation of hydrobromic acid, Wade's, Fothergill's, Squibb's, Markoe's, Hager's (bromine and hyposulphite of sodium), Champion and Pellet's (bromine and paraffin), and Bruylant's (reaction of bromine with a hydrocarbon oil), recommends the following, which is just as applicable to the production of 1 pound as to 100 pounds of the acid: Into a flask of about 300 ounces capacity, place 120 fluid ounces of water and 5 pounds of bromine. Connect the flask with the wash-bottle of a sulphuretted hydrogen generator, the delivery-tube of which reaches to the bottom of the flask and dips into the bromine. Pass a brisk current of H_2S through the apparatus for an hour, or until the bromine has entirely disappeared. This may be known to have taken place when, on agitating the liquid, no red color is imparted to it. The flask will now contain a mixture of hydrobromic and sulphuric acids, free sulphur, and a small quantity of a dark fluid, which is a compound of bromine and sulphur, but which decomposes, on boiling with water, into sulphur and hydrobromic acid. The contents of the flask are at once transferred to a retort, and distilled until reduced to about 10 ounces, or until a trace of sulphuric acid begins to come over; the first portion of the distillate being weak in acid, and containing generally a little free sulphur carried over mechanically. The distillate is finally diluted to a specific gravity of 1.300, and should measure 172 fluid ounces and weigh 14 pounds. It contains exactly 34 per cent. of HBr when of the specific gravity named, which strength Mr. Fletcher recommends for adoption in the British Pharmacopœia.—Yearbook of Pharm., 1881, pp. 460–466.

Hydrobromic Acid—Preparation.—In 1873 (see Proceedings, 1874, p. 180) Mr. R. Rother had communicated a process for the preparation of bromide of calcium, which depended upon the decomposition of bromide of sulphur in the presence of water into hydrobromic acid and sulphurous acid. He has since found that if a sufficient quantity of bromine is employed the sulphur is completely oxidized so as to form sulphuric acid, and he now proposes to apply this to the preparation of hydrobromic acid, since 1 part of sulphur may thus be made to convert 15 parts of bromine into hydrobromic acid. The sulphuric acid is neutralized by the addition of a certain quantity of magnesia, whereby sulphate of magnesium being formed, considerable bumping occurs during certain stages of the distillation. When this occurs the retort is permitted to cool, and the crystals of sulphate of magnesium are removed, rinsed, the liquid returned to the retort and again distilled, etc. The following is the author's process: Take of bromine, 15 troy ounces; sulphur, 1 troy ounce; magnesia, 1¼ troy ounces; water, 30 troy ounces. Place the sulphur (and magnesia? Rep.) and water into a long-necked flask, and add the bromine, then set the mixture aside and shake it up at intervals until a colorless solution is obtained. Pour this into a suitable retort properly connected with a receiver, and apply heat by means of a sand-bath until succussions of the liquor appear. Then let the retort cool, and remove the colored residue (deposit? Rep.). Resume the distillation until the succussions again arise, and then operate as before. Continue in this order until no more distillate is collected. The distillate contains about 35 per cent. of HBr.—The Pharmacist, March, 1882, pp. 87–90.

Hydrobromic Acid—New Method of Preparation.—Mr. August Harding describes (in "Ber. d. d. Chem. Ges.," 1881, p. 2085) a method for the preparation of hydrobromic acid, which is based upon the fact that bromine and hydrogen unite when passed together through a red-hot tube. For the details of the process and a description of the apparatus necessary for its execution see New Rem., February, 1882, p. 43.

Hydrobromic Acid—Variability in Strength.—J. C. Thresh and R. Wright, having found some commercial hydrobromic acid of unsatisfactory strength, prepared some by what is known as Fothergill's process, but found the latter also unsatisfactory. Further experiments showed that when tartaric acid and bromide of potassium were employed in theoretical quantities to produce acid solutions of 5, 10, 15, and 20 per cent. HBr respectively, the resulting products only contained 1.8, 3.8, 7.6, and 8.7 per cent. HBr respectively. In the same ratio of progression stronger acid liquids can be obtained, up to 15 per cent. of actual HBr, but that appears to be the limit, the addition of more tartaric acid and bromide of potassium causing no further increase in strength.

In contradiction of the conclusions of A. N. Palmer that hydrobromic acid made by Fothergill's and Wade's processes contain the theoretical quantity of HBr, and that they are simply contaminated by the presence of cream of tartar held in solution by the acid, the authors find that undecomposed bromide of potassium will crystallize out if such acids are evaporated to syrupy consistency, the excess of tartaric acid remaining in solution.

Of eight samples of commercial hydrobromic acid four were found to have been made by distillation, and to contain about 8 per cent. of hydric bromide; three were made by Fothergill's process and contained about 4 per cent. instead of 8.2 per cent.; the eighth sample had evidently been made as directed by Wade, and contained 7–8 per cent. of acid instead of 16. The authors consider that inasmuch as pure acid procured by distillation is both inexpensive and readily attainable, the acid made by decomposition of the bromide with tartaric acid should be discarded. The latter is recognized by giving a precipitate of cream of tartar, after more or less time, upon adding a few drops of liquor potassæ and shaking.—Yearbook of Phar., 1881, pp. 457–460.

Solutions of Hydrobromic Acid—Strength.—The tables of the amount of anhydrous hydrobromic acid present in solutions of hydrobromic acid hitherto published being found somewhat incomplete and not concordant, Dr. Biel has made a fresh series of determinations, which he communicates in the following table as representing the sp. gr. at 15° C. of solutions containing from 1 to 50 per cent. of anhydrous acid:

Anhydrous acid—per cent.	Sp. gr. at 15° C.	Anhydrous acid—per cent.	Sp. gr. at 15° C.	Anhydrous acid—per cent.	Sp. gr. at 15° C.
1	1.0082	18	1.145	35	1.314
2	1.0155	19	1.154	36	1.326
3	1.0230	20	1.163	37	1.338
4	1.0305	21	1.172	38	1.350
5	1.0380	22	1.181	39	1.362
6	1.0460	23	1.190	40	1.375
7	1.0530	24	1.200	41	1.388
8	1.0610	25	1.209	42	1.401
9	1.0690	26	1.219	43	1.415
10	1.0770	27	1.229	44	1.429
11	1.0850	28	1.239	45	1.444
12	1.0930	29	1 249	46	1.459
13	1.1020	30	1.260	47	1.474
14	1.1100	31	1.270	48	1.490
15	1.1190	32	1.281	49	1.496
16	1.1270	33	1.292	50	1.513
17	1.1360	34	1.303		

—Phar. Jour. Trans., February 11th, 1882, p. 666; from Phar. Zeitschr. f. Russ., January 3d, 1882, p. 7.

Bromide of Ammonium—Properties.—J. M. Eder has investigated some properties of pure ammonium bromide. Its sp. gr. in the crystalline state is 2.327, after sublimation, 2.3394. The salt is not altogether stable in presence of light and air; it turns a golden color, and then contains hydrobromic acid and free bromine.

The author found that a decrease of temperature is produced when ammonium bromide is dissolved in water. The following are the values of the solubility of one part of the salt in water at:

10°	16°	30°	50°	100°
1.51	1.39	1.23	1.06	0.78

One part ammonium bromide requires 32.2 (?) parts of alcohol at 15°, and 890 (? Ed. N. R.) parts of boiling alcohol. Aqueous ammonium bromide solution of various concentration showed the following specific gravities:

P. c. am. brom. in sol.:	5	10	15	20
Sp. gr. of sol. at 15°:	1.0326	1.0652	1.096	1.1285

The dissociation of ammonium bromide solution begins at 16°, and is very marked at 30°. Quantitative experiments were made with a view of determining the amounts of ammonia obtained by the distillation of an ammonium bromide solution (3.100). The amounts of ammonia so given off decrease after each successive distillation, in proportion as the hydrobromic acid remaining in solution increases. An alcoholic solution of ammonium bromide evolves ammonia on boiling. On heating dry ammonium bromide, which always shows an acid reaction, large quantities of ammonia are evolved at the commencement of the sublimation.—New Rem., January, 1882, p. 13; from Wien. Akad. Ber., 82, 1284, in Journ. Chem. Soc.

Tribromide of Ammonium—Formation.—H. W. B. Roozeboom has observed that when bromine is added to a concentrated aqueous solution of bromide of ammonium, a considerable rise in temperature is produced. The solution slowly deposits prismatic crystals resembling bichromate of potassium in color, and which have the composition NH_4Br_3. On exposure to the air the bromine escapes. Ammonium tribromide appears to combine with a molecule of bromine, but the pentabromide has not yet been isolated.—Jour. Chem. Soc., February, 1882, p. 139; from Ber. d. d. Chem. Ges., p. 14, 2398–2400.

IODINE.

Iodine—Determination.—When the method of Reinige (with permanganate of potassium) is followed for the determination of iodine, the hydrated peroxide of manganese, separated thereby, remains suspended for some time, making it difficult to determine the excess of permanganate used. This difficulty is obviated, according to G. Klemp, by the addition of an aqueous solution of pure chloride of zinc; the voluminous precipitate of basic carbonate of zinc produced thereby carries the precipitate of hydrated peroxide of manganese with it, and the liquid becomes clear in a few seconds after removal from the fire. It is important that the carbonate of potassium be present in small excess. Controlling experiments have proved the reliability of the method.—Archiv d. Pharm., November, 1881, p. 359; from Zeitschr. f. Anal. Chemie, xx, No. 2.

Iodine—Determination in Cod-Liver Oil.—See *Cod-Liver Oil*, under "Materia Medica."

Hydriodic Acid—Stability in the form of Syrup.—See *Syrup of Hydriodic Acid*, under "Pharmacy."

Iodide of Potassium—Test of Purity.—Schneider recommends the method of Kaspar for determining the purity of iodide of potassium, particularly for the examinations attending the revisions of German apothecary shops. The method is dependent on the formation of the double salt, iodide of potassium and mercury, and differs from the methods of Martzeau and Personne only in the strength of the solution of the salt to be examined and the reagent, which being much more concentrated, gives more accurate indications of foreign salts present. The reagent is made by dissolving 2.71 grams corrosive sublimate in sufficient water to make 100 c.c. of solution. The solution of iodide of potassium is made of a strength of 1 gram in 5 c.c. 0.5 gram of iodide of potassium (=2.5 c.c. of solution) are tested at a time, 5 c.c. of the solution of corrosive sublimate being added gradually, with agitation after each addition, until the precipitate formed is redissolved. If at any time before the whole of the reagent has been added a permanent turbidity results, a foreign salt is present, the quantity depending on the period at which this occurs, being the larger the sooner turbidity is permanent.—Archiv d. Pharm., January, 1882, pp. 39–44.

Iodide of Lithium—Preparation and Uses.—Professor Zeisst, of Vienna, recommends this salt in such cases where other iodides and iodine preparations are not tolerated. It is conveniently given in form of pills (which see, under "Pharmacy"). For obtaining the salt, a solution of ferrous iodide is first prepared from 127 parts iodine, 33 parts iron filings, and 300 parts water. To this is gradually added 38 parts lithium carbonate, and after decomposition, the liquid is filtered and evaporated in the usual manner.—Amer. Jour. Pharm., June, 1882, p. 308; from Pharm. Centralh., 1882, p. 134.

FLUORINE.

Fluorine—Occurrence in the Free State in Fluorspar.—When a piece of the violet-black fluorspar of Wölsendorf is fractured a distinct odor, resembling that of chlorine gas, becomes evident. This odorous substance has been the subject of different investigations, without, however, giving satisfactory results. Mr. Oskar Löw has now determined this substance to be free fluorine, the presence of which is doubtless due to the dissociation of a foreign fluoride in admixture with the fluoride. The fluorspar of Wölsendorf contains cerium, and it is doubtless the fluoride of this substance to which the peculiarity of the mineral is due. Archiv d. Pharm., July, 1881, p. 59; from Ber. d. d. Chem. Ges., pp. 14, 1144.

Hydrofluoric Acid—Corrosive Action and Treatment.—Mr. Robbins, assistant in the Chemical Laboratory of the Institute of Technology, (Boston) describes the action of hydrofluoric acid, which had accidentally come in contact with the ends of his finger and thumb. At first the effect was scarcely noticeable, but gradually the parts became benumbed, with some pain, which increased until it resembled the sensation of a burn when held to the fire. This lasted during the night, but subsided during the next day. The affected parts became white and very hard, the latter increasing and penetrating gradually during the course of the early stages. Various applications were made, but poultices, alternating with frequent soakings in very hot water, finally proved effectual. The difficulty in healing (fully twenty days were required) appeared to consist in removing the slough—which is very dry and tough—as it heals very quickly when this is out of the way; and after the first siege of pain, which is a long and severe one, the sore is no more painful than any other of equal size. The author thinks that should he meet with the same accident again, he should lose no time in washing off the acid as thoroughly as possible and then apply water-glass if this were accessible; if not, he would use an alkali, and, if possible, soak the part in water as hot as could be borne, and apply cold-cream, or some other dressing which will keep the part soft, and also exclude the air.—New Rem., February, 1882, p. 48; from Boston Med. and Surg. Jour.

Fluoride of Potassium—Value in Rheumatism.—Dr. Da Costa speaks well of this salt as a remedy in acute rheumatism. It increases the flow of urine and lessens the pain. It was administered in 0.3 gram doses every three hours. In doses of 0.6 to 1.2 grams it produced vomiting and great after depression. If the exhibition of this salt produce disturbances of the digestive organs the dose ought to be reduced to 0.1 to 0.2 grams. Dr. Da Costa believes fluoride of potassium to be a cure for drunkenness.—Chem. Jour., February 3, 1882, p. 63; from Monit. des Produits Chim., January, 1882.

PHOSPHORUS.

Phosphorus—Pulverization.—A writer in "Phar. Zeitschr. f. Russl." gives the following method for reducing phosphorus to fine powder: Cut up the phosphorus under water; throw it into a flask containing a strong solution of common salt. Heat until the phosphorus melts, and shake till cold. Pour off the salt solution, wash well, and preserve under water.—Chem. Jour., June 16th, 1882, p. 371.

Oxyiodide of Phosphorus—Formation and Characters.—Mr. Beverly S. Burton has frequently observed the formation of minute golden scales during the preparation of iodide of ethyl, and has succeeded in separating them in a pure condition by treating the residue of the reaction, in which they occur, with water, filtering the solution, and evaporating. The crystals obtained were further purified by repeated crystallization. The new body is very soluble in water, alcohol, and ether, forming perfectly colorless solutions, which is very remarkable, since the compound itself is yellowish-red. As obtained at different times its composition varies, and further experiments are necessary to establish its formula.—Chem. News, December 2d, 1881, p. 268; from Amer. Chem. Jour.

Hyposulphite of Calcium—Influence of Excess of Lime on its Production.—Mr. W. F. Short has made some experiments, with the object of ascertaining the causes which sometimes lead to a failure in obtaining hypophosphite of calcium by the usual process of boiling together phosphorus and calcium hydrate. The results of these experiments indicate that when any proportion of phosphorus and calcium hydrate are boiled together with water, a little hypophosphite is no sooner formed than a portion of it is decomposed by the hydrate which has not yet entered into combination, giving rise to the production of phosphate, and in fact, if large excess of calcium hydrate is used and the boiling continued long enough, the product consists entirely of phosphate. On the other hand, pure calcium hypophosphite was boiled with excess of phosphorus for four hours, both in a flask and in an open dish, with the result that very little phosphate was formed in each case. The same was the case when the pure hypophosphite was boiled by itself, but if boiled with hydrate of calcium, the formation of phosphate followed, with evolution of hydrogen, until complete conversion had resulted. The author will continue his experiments with the view of overcoming the difficulty.—Phar. Jour. Trans., April 8th, 1882, p. 824.

Phosphoric Acid—Determination by Standard Solutions.—E. Perrot recommends a process, which is based on the precipitability of calcium phosphates by ammonia, the solubility of calcium and magnesium phosphates in acetic acid, and the insolubility of iron and aluminium phosphates in this reagent, and on the power of the soluble phosphates, acid or basic, to precipitate salts of silver as a yellow tribasic silver phosphate, insoluble except in ammonia. He dissolves 6.895 grams of pure silver nitrate in distilled water, and makes up to 1000 c.c.; 100 c.c. of this solution correspond to 0.4565 gram metallic silver, and precipitates 0.710 gram phosphoric acid. He dissolves 5.414 grams of sodium chloride in distilled water, and makes up to 2000 c.c.; 100 c.c. of this solution precipitate 0.500 gram of silver. He dissolves the phosphatic matter in nitric acid of sp. gr. 1.030. The solution is filtered, the insoluble part washed with hot distilled water, and the washings are added to the acid filtrate, which is supersaturated with ammonia. The precipitate is washed with ammonia water on a small filter, and it is then dissolved upon the filter—changing the recipient—by sprinkling it with acetic acid. The calcium and magnesium phosphates alone are dissolved. The liquid is mixed with ammonia till a precipitate begins to appear, which no longer dissolves on shaking. The addition of a drop of acetic acid will redissolve this precipitate, and the liquid, contained in a stoppered bottle holding 250 c.c., is treated with 100 c.c. of the standard silver solution, when, on agitation, the characteristic yellow precipitate of silver phosphate appears. When it has settled, the excess of silver remaining in the liquid is determined by running in the salt solution from a graduated burette.—Chem.

News, October 28th, 1881, p. 214; from Compt. Rend., September 19th, 1881.

Ortho-phosphoric Acid—Production of Crystals.—Mr. H. P. Cooper has made some experiments with a view to determine the conditions necessary to insure the formation of crystals of ortho-phosphoric acid, uncontaminated with other varieties. Starting with a solution of pure ortho-phosphoric acid, of sp. gr. 1.750,—the most concentrated acid met with in commerce,—he subjected portions to evaporation in platinum capsules so as to obtain higher concentrations. An acid of sp. gr. 1.875 gelatinized on standing, but was found to contain both phosphoric and metaphosphoric acid. None of the acids of lower sp. gr. would crystallize spontaneously, but on adding a crystal of sulphate of sodium to an acid of sp. gr. 1.850, splendid tufts of prismatic crystals were formed, which rapidly grew until the contents of the bottle were transformed into an almost solid mass. The smallest fragment of the crystallized acid will induce crystallization in a large bulk of liquid acid, sp. gr. 1.850. An acid of a sp. gr. lower than 1.800 will not yield crystals. The crystallized acid is very deliquescent. The liquid acids below sp. gr. 1.875 contain no meta or pyrophosphoric acids.—Yearbook of Phar., 1881, p. 515–516.

BORON.

Boracic Acid—Uses in Surgery and in Cholera.—The use of boracic acid in surgery has shown it to be a drug of greater power and wider range of applicability than was formerly supposed. It is used with success on old sores and ulcers, both simple and specific, and also in the treatment of large suppurating wounds and abscesses it has been found of especial value. In ozæna and otorrhœa it acts as a prompt deodorizer and alterative, lessens the discharge and promotes healthy action. As a lotion in chronic cystitis and chronic inflammation of mucous membranes in general it has a decidedly beneficial action. The London "Lancet" calls attention to the value of boracic acid in cholera, as exhibited in the cases treated by Surgeon Butler, of the Madras Medical Service. It was, it appears, at the period when the properties of boracic acid were first made public that Dr. Butler determined to try its effects in this direction. The pure acid not being procurable, the biborate of sodium (borax) was at first employed, and with marked benefit, the percentage of recoveries being from 70 to 75 per cent. Subsequently, he used the pure acid in 10-grain doses every two hours, combined with borax or biborate of sodium, under which treatment every case recovered. Dr. Butler further asserts that in no case were any signs of irritation or ill effects observed from the remedy, and in all of them the renal secretion was re-established with much greater facility than under any other method.—Am. Jour. Pharm., August, 1881, p. 424; from South. Med. Record.

Boracic Acid.—New Antiseptic Compound with Glycerin, which see, under "Organic Chemistry."

SILICON.

Silicium—Compound with Carbon, etc.—P. Schützenberger and A. Colson have observed that crystalline silicium, heated almost to whiteness in an atmosphere of carbonic acid, absorbs this gas rapidly, and is ultimately converted into a greenish-white mass. On being freed from unchanged silicium by treatment at a boil with moderately concentrated potassa lye, the residue is found partially soluble in hydrofluoric acid, which dissolves silica and leaves a residue, which, when washed and dried, is a greenish powder, not attacked by boiling alkaline lyes or by acids, including the hydrofluoric. If heated to redness in a current of oxygen it is little modified, and yields carbonic acid, corresponding only to 2 or 3 per cent. of carbon. But if heated to dull redness with chromate of lead and litharge it becomes incandescent, and evolves notable quantities of carbonic acid. On analysis it is found to contain 21.4 per cent. of carbon. The silicium nitride of Woehler contains also carbon. Hence the authors admit the existence of a tetratomic radicle, *carbo-silicium*, which, like carbon, yields a binoxide and a nitride. On heating the product of the action of dry ammonia upon silicium chloride in a current of hydrogen, the authors obtained a white powder, $Si_5N_6Cl_2$. If this powder is heated to redness in a current of ammonia it loses all its chlorine in the form of hydrochloric acid, and leaves a residue, Si_2N_3.—Chem. News, August 5th, 1881, p. 70; from Compt. Rend., No. 26, 1881.

Oxychloride of Silicon—Preparation.—L. Troost and P. Hautefeuille find that on passing a heated mixture of chlorine with one-half or one-fifth of oxygen over crystalline silicon, a mixture of silicon oxychlorides and dichloride is obtained. The heat evolved is sufficient to continue the reaction when once it has commenced. Too high a temperature is to be avoided, since the vapors of the dichloride and oxychlorides form a thick cloud, which is only condensed with difficulty. The action of the mixture is not so violent as that of chlorine alone. —Jour. Chem. Soc., July, 1881, p. 508; from Bull. Soc. Chim. (2), 35, pp. 360–361.

Silica—Crystallization.—R. S. Marsden has observed that, when some silver and carbon were fused in Berlin porcelain crucibles, the silica of the glaze of the crucibles was absorbed into the silver, from which it was separated by nitric acid in the usual hexagonal crystals, and also in a leaflike form.—Jour. Chem. Soc., June, 1882, p. 571; from Proc. Roy. Soc. Edin., 11, pp. 37–40.

Pumice-stone—Production in the Island of Lipari.—Messrs. Toso and Baldacci have published the particulars of the production of pumice-stone in the Island of Lipari. It is found chiefly in the northern part of the island, on the slopes of the mountains, called Punta della Castagna, Monte Pelato, and Monte Chirica, which appear to have formed part of a great crater, formed of inclined layers of stones and ashes from volcanic eruptions. The stratum containing the pumice-stone is covered with a layer of stones, in some cases reaching 40 yards in thickness. These deposits are usually worked by an inclined gallery driven in the hillside at a right angle to the dip; from the bottom of this, a level 6 feet by 6 feet is driven along the strike, and, from this, other galleries are driven at intervals, following the inclination of the stratum. When one of the galleries has reached the boundaries of the workings, it is filled with rubbish to within 18 inches of the top, and another gallery, about 8 feet wide by 6 feet high, is commenced parallel to the first, leaving a sufficient thickness of material as support for roof. When all the lower portion of this deposit has been worked away, a slice about 6 feet in height is removed in the same way, and this operation is continued until the roof of the deposit is reached. The pumice-stone is brought down to the village of Canneto, where it is sorted and prepared. About 6000 tons are annually exported.—Pharm. Jour. Trans., March 4th, 1882, p. 728; from Jour. of the Soc. of Arts, February 24th, 1882.

CARBON.

Adamantine Carbon (Diamond)—Preparation.—R. S. Marsden finds that, on heating to a high temperature for ten hours, and then cooling very slowly, a mixture of silver and amorphous carbon (from sugar), three forms of carbon are found to exist in the silver, from which they can be readily removed by treating the mass with nitric acid. The three forms are: Graphite, in largest proportion; a number of small crystalline bodies of octahedral form, and a quantity of a brownish substance, probably amorphous carbon, or silver carbide. This last form, which is flocculent, is easily removed by washing the mixture with hydrofluoric acid, ammonia, and potash. The crystals thus cleaned are hard, scratching quartz, glass, and sapphire, and burn away slowly when heated in a stream of oxygen. Microscopic examination of the crystals shows that there are two kinds present, dark-colored and transparent. The dark-colored ones are believed to be true diamonds, the darkness being due to dissemination of amorphous carbon through them; they have a perfect octahedral form with curved edges. The transparent crystals have an adamantine lustre, and high refractive power; this form is octahedral, but the edges are not curved, and they act on polarized light. The author believes that by employing 200–300 ounces of the metal, he will be able to produce larger diamonds, fit for rock-boring.—Jour. Chem. Soc., August, 1881, p. 682; from Proc. Roy. Soc. Edin.

Carbonic Acid—Solubility in Certain Aromatic Waters.—It having been stated that carbonic acid is more soluble in peppermint water than in pure water, Mr. C. H. Bothamley undertook a series of experiments with a view to ascertain whether this is really the case, and whether the property is common to other aromatic waters. For this purpose a current of pure and dry carbonic acid was passed continuously for several hours into a measured quantity of water, contained in a large test-tube, surrounded by water, the temperature of which was carefully noted. The apparatus (which is represented by a cut and is fully described) was then disconnected, the carbonic acid expelled from the upper part of the test-tube, the water transferred to a flask containing ammoniacal chloride of calcium solution, and the flask tightly corked. After standing over night, the liquid was rapidly filtered with as little exposure to air as possible, and, after washing, the precipitated carbonate of calcium was dissolved in a measured quantity of normal hydrochloric acid, and the excess of acid determined by means of standard alkali. By simple calculation the amount of carbonate of calcium precipitated, and from that the volume of carbonic acid dissolved in the water, was readily obtained; the following table showing that carbonic acid is only slightly more soluble in the three aromatic waters experimented with than in water:

100 vols. temp. 17.5° C. (= 63.5° F.).	Sp. gr.	Vols. of CO_2 (measured at 0° C. and 760 mm.) dissolved.
Distilled water, ...	1.000	94.19
Peppermint water, ...	1.001	94.77
Dill water, ...	1.000	97.57
Cinnamon water, ...	1.002	101.48

Experiments were also made to determine whether the evolution of carbonic acid from bicarbonate of sodium upon decomposition by an acid is greater in the presence of distilled water than in the presence of an aromatic water. Mr. Bothamley's results show that just the reverse is the case, the quantities of gas given off under identical conditions being: from distilled water, 78.40 c.c.; from peppermint water, 83.15 c.c.; from dill water, 79.98 c.c.; and from cinnamon water, 80.52 c.c. It was immaterial whether citric or hydrochloric acid was used for the decomposition of the bicarbonate. These results are interesting, since they are in contradiction to a very generally accepted view, held particularly by German pharmacists.—Yearbook of Pharm., 1881, p. 432–436.

Carbonic Acid—Estimation.—Mr. T. S. Gladding describes the following apparatus for the estimation of carbonic acid, which has been in use for several years, and has proved indispensable on account of its great convenience and accuracy. It consists of the ordinary generating flask, followed by an empty U-tube, to retain condensed water-vapor; this is succeeded by four potash bulbs of the Geissler form. The first of these contains H_2SO_4, to dry the gas. The next two contain potash solution of sp. gr. 1.27, for absorbing the CO_2; the last contains concentrated H_2SO_4, to absorb the moisture taken up from the potash solution. Then comes a U-tube containing soda-lime and serving as a guard. The last three Geissler bulbs constitute the weighable portion of the apparatus. Perfectly dry air, plus CO_2, enters there, and perfectly dry air alone escapes. The increase in weight gives the amount of CO_2.—Chem. News, July 1, 1881, p. 4.

Bisulphide of Carbon—Purification,—P. Palmieri recommends, after removing the aqueous layer with which commercial carbon bisulphide is usually covered, adding to every 100 parts of the latter from 2 to 3 parts of anhydrous cupric sulphate, and subsequently well agitating the mixture. When the cupric sulphate, which becomes perfectly black, is deposited and the odor of sulphuretted hydrogen is no longer preceptible, the liquid is filtered or decanted. Absolute purity is obtained when the carbon bisulphide is again rectified over anhydrous cupric sulphate. In order to maintain the carbon bisulphide, which in this manner is said to lose all disagreeable odor, permanently pure, it may be allowed to remain in contact with a little anhydrous cupric sulphate. The employed cupric sulphate may be made available for further use in purification by ignition, treatment with sulphuric acid, and subsequently again igniting. E. Allary (Bull. de la Soc. Chim., 35, p. 492) covers the carbon bisulphide to be purified with an aqueous layer, and then adds gradually, with active agitation, a solution of potassium permanganate until the aqueous layer remains permanently red. The product is then washed with water, and finally separated in a separatory funnel. In most cases a further purification by rectification is not necessary.—Am. Jour. Phar., June, 1882, p. 285, from Zeitschr. f. Analyt. Chem., 1882, xxi., p. 255.

Bisulphide of Carbon—Purification.—E. Allary finds that the usual method of purifying bisulphide of carbon, by distillation, is in most cases practically useless. He recommends, in order to free it from fœtid impurities, that it be agitated with a concentrated solution of permanganate of potassium until the presence of a violet-tint shows that the reducing action has ceased. The bisulphide of carbon is then washed with water, separated by a funnel, and finally filtered; the pure ethereal-smelling liquid is then preserved from the action of the light.

—New Rem., January, 1882, p. 22; from Bull. Soc. Chim. (2), p. 35, 491.

Thiocarbonate of Magnesium—Preparation.—This compound is obtained by I. Taylor in the following manner: A strip of magnesium ribbon is coiled about a piece of platinum foil, which is placed in a flask, and covered half with bisulphide of carbon, the remaining half in water. In a few hours the water acquires a light-yellow tint, which deepens in two or three days to a bright golden-yellow. Sulphocarbonate of magnesium is formed, probably according to this equation:

$$3CS_2 + Mg_2 + H_2O = 2MgCS_3 + CO + H_2$$

The use of platinum foil is not essential, the reaction being slower without it.

Thiocarbonate of Sodium may be obtained by decomposing water, in presence of bisulphide of carbon, with sodium amalgam. Bisulphide of carbon is placed in a flask and water added, then a quantity of sodium amalgam. The flask is well-shaken, when thiocarbonate of sodium is rapidly formed, with evolution of hydrogen and carbonic oxide.—Chem. News, March 24, 1882, p. 125.

CYANOGEN.

Hydrocyanic Acid—Determination in a Case of Poisoning, two Months after Death.—E. Reichardt describes the method whereby he determined the presence of hydrocyanic acid in different parts of the body (stomach, heart, spleen, liver, etc.), two months after the decease of a person suspected of being poisoned. The distillates from these different parts revealed its presence by the formation of Prussian blue when ferroso-ferric chloride was added, followed by alkali in faint excess, and, after a short time, distinct acidification with hydrochloric acid. The presence of the acid was confirmed by its reaction upon guaiacum-copper-paper, which test is made by exposing filter-paper, wetted with tincture of guaiacum and a very dilute solution of sulphate of copper to the vapor containing the acid, when a blue color will at once be developed. The author regards the failure of this reaction to be positive evidence of the absence of hydrocyanic acid, but that the success of the reaction is only valuable as confirmatory to the prussian blue test. The presence of hydrocyanic acid was furthermore constated by the odor developed from the united portions of Prussian blue obtained.—Arch. d. Pharm., September, 1881, pp. 204–211.

Dr. E. Zillner gives the details of examination in a case of poisoning by cyanide of potassium, which also proves the stability of hydrocyanic acid in the human cadaver. In this case hydrocyanic acid was clearly detected one hundred and fifteen days after death.—Pharm.

Ztg., No. 94, 1881, p. 702; from Vierteljahrschr. f. Ger. Med., xxxv, No. 2.

Hydrocyanic Acid—Presence in the Bodies of Dead Animals.—Ch. Brame has determined that hydrocyanic acid is quite permanent in the bodies of animals that have died by its action, and that, if it has been given in sufficient quantities, the bodies of such animals are preserved from change, after burial, for at least one month. It is found in the stomach and in the animal tissues, with which it appears to form an intimate combination. It is determined in such,—with more difficulty in the case of carnivorous than in that of herbivorous animals,—by distillation.—Arch. d. Pharm., September, 1881, p. 225; from Jour. de Pharm. et de Chim. (5), iii, p. 579.

Ferrocyanide of Potassium, etc.—Limit of Reaction with Copper and Iron.—A Wagner finds that for iron the limit of visible reaction with potassium ferrocyanide, is 1 part in 500,000; with potassium sulphocyanide, 1 part in 1,600,000; and with tannic acid, 1 part in 350,000, the limit in this latter case being indistinct. For copper, with ferrocyanide, the limit is 1 part in 200,000 of water; with ammonia, 1 part in 25,000; and with potassium xanthogenate, 1 part in 900,000 of water. For silver, with potassium xanthogenate, the limit is 1 part in 40.000 of water. For mixtures of ferric and cupric salts, with potassium ferrocyanide, the blue reaction was faintly perceptible in a mixture of 3½ volumes cupric and 1 volume ferric solution, each containing 1 part metal in 100,000 water. With ammonia, the blue reaction was first perceptible in a mixture of 1 volume cupric and ½ volume ferric solutions, each containing 1 part metal in 10,000 water. If the iron is in larger proportions, there appears merely a yellow coloration. On these limits of reaction the author founds an approximate method for the determination of iron and copper.—New Rem., April, 1882, p. 123.

Seleno cyanides.—A number of these compounds are described under "Selenium," which see.

Chromocyanide of Potassium—Preparation and Characters.—Mr. H. Moissan obtains this compound by the action of cyanide of potassium upon a solution of protochloride of chromium, or by heating to 100° in a sealed tube chromium ground up with a concentrated solution of cyanide of potassium, or by the action of cyanide of potassium upon chromous carbonate. The compound appears in fine yellow crystals, having a specific gravity 1.71. Its physiological action is similar to that of ferrocyanide of potassium, which it closely resembles by the generality of its characters.—Chem. News, January 13th, 1882, p. 22; rom Compt. Rend., December 22d, 1881.

POTASSIUM.

Potassium—New Reagent.—According to L. L. de Koninck, a reagent for potassium, much more sensitive than platinic chloride, is obtained by adding to a solution of nitrite of sodium containing about 10 per cent. of the salt a little cobaltous chloride and acetic acid. This reagent produces, in a solution containing 1 per cent. of chloride of potassium, immediately a yellow precipitate. The latter is still obtained when the solution is diluted to 1 in 1000, but at a dilution of 1 in 2000, no precipitate makes its appearance.

Ammonium salts produce a similar, but less sensitive reaction. Salts of magnesium, calcium, barium, strontium, iron, aluminum and zinc are not precipitated by this reagent. The reaction is, in the main, nothing else than an inversion of the well-known reaction for cobalt by nitrite of potassium.—New Rem., September, 1881, p. 280; from Zeitsch. f. Anal. Chem., 1881, p. 390.

Professor Charles O. Curtman communicates to "New Rem." (November, 1881, p. 324), a translation of a paper which he had on July 3d sent to the "Deutsche Chemische Gesellschaft" (see Ber., No. 14, 1881), from which it appears that he has independently reached the same results. He states that when to a saturated aqueous solution of sodium nitrite acetic acid is added until a sufficiently acid reaction ensues, and then cobaltous nitrate (about one-tenth of the nitrite of sodium employed), the liquid will form a deep yellowish-purple solution of sodio-cobaltic nitrite.

If this solution be added to that of a potassium salt, in sufficient concentration, there is formed at once the well-known yellow precipitate of tripotassic cobaltic nitrite, which serves in the separation of cobalt from nickel. In more dilute solutions, the precipitation requires a little time; when very great dilutions are used even several hours. All the conditions and cautions observed in the process for separation of cobalt and nickel by potassic nitrite, must, of course, be observed also. Besides the salts of potassium, those of rubidium, cæsium, and ammonium are also precipitated. No precipitate falls, however, with lithium, barium, strontium, calcium, or magnesium, provided the reagent be free from sulphuric acid. Hence, potassium may be determined directly in presence of these bases. Neither is it necessary to convert the salt into that of another acid, as the reaction occurs with equal promptness when potassium sulphate, phosphate, acetate, chloride, or nitrate is used. Potassium iodide is not suitable on account of the separation of free iodine interfering with the prompt recognition of the precipitate.

While it is very probable that the method is suitable also for quantitative determinations, he has not yet sufficiently investigated this to affirm it positively.

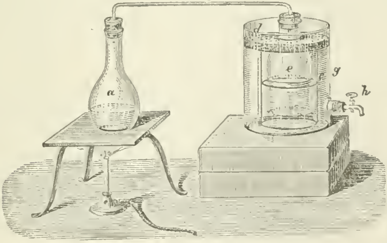
AMMONIUM.

Sulphate of Ammonium—Preparation from Gas Liquor.—Mr. Marche communicates in "Comptes Rendus," a method for the manufacture of sulphate of ammonium from gas liquor, which, unlike those in general use for the purpose, is applicable to small gas-works. The process consists in the employment of crude sulphate of alumina, or alum cake, instead of sulphuric acid. The apparatus consists of (1) a wooden vat, which is filled with the liquor, to which the sulphate is added in the proportion of 4.5 kilos per hectoliter, whereby, after ten to twelve hours, the ammonia is converted into sulphate; (2) an evaporating-pan of sheet-iron, in which the evaporation of the liquor is effected by means of the waste heat of the ovens; (3) a small cask in which the lixiviation (draining of the sulphate of ammonia? Rep.) is effected—the mother liquor returning into the pan and mingling with the liquor of other operations. The reaction is complete, and the process is applicable to the smallest works.—Oil, Paint and Drug Rep., July 13th, 1881, p. 47.

Ammonia—Manufacture from the Atmosphere.—A process for the manufacture of ammonia from the nitrogen of the air, invented by Messrs. Rickman and Thompson, encourages belief that this often-attempted problem has at last approached a practical solution. The process is based on the deoxidizing of air by coal-dust in the presence of water vapor at a full red heat, the water being simultaneously decomposed and yielding hydrogen, which combines in the proper proportion with the nitrogen thus set free. Common salt is introduced with the coal into the furnace wherein the reactions are effected, which at the bright-red heat maintained is also decomposed. The free chlorine from the salt combines with the nascent ammonia, forming therewith ammonium chloride. The ammonia being thus combined, it does not decompose under the action of the heat as would otherwise be the case. Should this process prove as practicable as has been anticipated, ammonium chloride will be furnished at a cheap rate and in large quantities, and will have great influence upon the future of artificial fertilizers.—New Rem., April, 1882, 122.

Ammonia—Simple Apparatus for its Determination.—Dr. O. Knublauch describes (in the "Zeitschrift für Analyt. Chemie," 1882, p. 161) a simple apparatus (Fig. 59) for the determination of ammonia by distillation, which, from the description, as well as the accompanying analytical data, appears to surpass in simplicity and efficiency all previous ones. It consists of a flask, *a*, of a capacity of 200 to 250 c.c., connected by means of the doubly bent glass tube, *b*, with the absorbing vessel, *c*, placed within the cooler, *g*. The latter differs considerably from the usual form of these vessels. The glass-tube, *b*, passes through a rubber stopper in the neck of the cylinder, *e*, which has no bottom, and the lower edge of which is bulged upwards and outwards in several places, so as to permit the gas-bubbles an easier escape into the surrounding liquid. The diameter of the lower part of the cylinder is about 1⅝ inches. Around the neck of *e* is attached a disk of cork which may be set by means of a wedge, and which is so adjusted that the lower edge of *e* is only a few millimeters distant from the bottom of the absorbing vessel. The vessel, *g*, within which the apparatus is placed, is filled with cold water; the latter may be drawn off at any time through the faucet and replaced by a fresh supply. The flask, *a*, is charged with about 25 c.c. of the ammoniacal liquid to be assayed. If it be a salt of ammonium, the solution is mixed with a slight excess of potassa. The absorbing vessel is charged with a quantity of standard sulphuric acid, more than sufficient to combine with all the ammonia capable of being generated, and the excess of acid left unneutralized is afterwards titrated back with standard alkali. The analytical results obtained by the author leave nothing to be desired.—New Rem., June, 1882, p. 174.

FIG. 59.



Knublauch's Apparatus for Ammonia Determination.

Ammonia—Delicate Test-paper.—According to Gustav Krouper, if fuchsine is dissolved in water and dilute sulphuric acid be added to the solution, its red color changes to yellowish-brown. Strips of unsized paper dipped in this solution, which should not be too dilute, assume, after drying, a handsome yellow color, resembling turmeric paper.

Gaseous ammonia coming in contact with this paper imparts to the latter a lasting carmine tint. This test-paper is useful for detecting traces of ammonia. The substance suspected to contain it is mixed with slaked lime, in a beaker or test-tube, moistened with a little water, and a strip of the test-paper suspended in the upper portion, the vessel being stoppered or covered. The paper is best used in a dry condition, since it acquires a bluish tint, when moistened, and the transition of this tint to red is not easily noticed. Decomposition of the ammoniacal salts may be hastened by warming the vessel; vapor of water does not color the paper.

When exposed to the air, the test-paper is gradually affected by the moisture contained in it. It should, therefore, be kept in well-stoppered bottles. But even then it does not keep for a long time, and had better be renewed occasionally.—New Rem., March, 1882, p. 88; from Phar. Post, 1882, No. 2.

CÆSIUM AND RUBIDIUM.

Cæsium—Isolation, Characters, etc.—Carl Setterberg has lately effected the isolation of cæsium. His method was the electrolysis of a fused mixture of cæsium and barium cyanides. Having relatively enormous quantities of the precious materials at command,—by means of a process of his own invention he has prepared 40 kilos of rubidium and 10 kilos of cæsium,—he has produced cæsium as a metal very similar to the remaining alkali-metals, silvery-white, very soft and ductile. On exposure to the air it ignites spontaneously, and if thrown upon water it burns like potassium, sodium, and rubidium. Its melting-point is 26.5°, and its sp. gr. 1.88. The author has proved anew, that in consequence of the affinity of the metal for oxygen, and the volatility of its salts, the preparation of cæsium by igniting the carbonate along with carbon—according to the ordinary method for obtaining rubidium and potassium—is quite impossible.—Chem. News, March 3d, 1882, p. 94; from Anal. der Chem.

Cæsium and Rubidium.—Compounds with silicomolybdic acid, and separation by its intervention. See Silicomolybdic Acid.

BARIUM.

Baryta—New Process of Preparation.—Maumené has invented a new process for preparing oxide of barium, which consists in heating sulphate of barium and ferric oxide to 1000°–1200°. Sulphurous acid and oxygen are eliminated and a residue of the composition Fe_2O_3BaO remains, from which, however, the Fe_2O_3 cannot be separated by treatment with water. The mixture is reduced at a red-heat in a current of hydrogen; it is then treated with sulphide of barium, whereby sulphide of iron and oxide of barium results, the latter being then extracted by water.—Phar. Ztg., No. 50, 1882, p. 369; from Dingl. Polyt. Jour.

Sulphate of Barium—Precipitation and Purification.—Mr. T. O'Connor Sloane states that to obtain a precipitate of sulphate of barium that will not run through filtering-paper the following rules should be observed: The solution should be barely acid. This end is best secured by the use of cochineal or some equivalent solution. The precipitant is added when the solution is nearly boiling, and the liquid is kept at that temperature for some time. A heavy precipitate will be formed with perfectly clear supernatant liquor. If iron is present some will be carried down, and the ignited sulphate of barium will not be white. To remove the iron the best method consists in decanting the clear supernatant liquid to the last drop through a filter-paper. To the precipitate left in the beaker 5 or 10 c.c. of concentrated hydrochloric acid are added, and the beaker is held (in an inclined position to prevent spirting) over and just touching a hot plate until the acid is in full ebullition, which is continued for about a minute. After cooling it is diluted, cochineal solution added, over-neutralized with ammonia, slightly acidified, and filtered. A perfectly white precipitate is obtained.—Chem. News, November 4th, 1881, p. 221; from Jour. Amer. Chem. Soc.

Barium Silicate—Formation of Crystalline Hydrate.—Le Chatelier has observed that, when kept for some time, solutions of baryta deposit a yellowish-white powder, and on the sides of the containing vessel beautiful transparent crystals are formed. These crystals, and apparently the deposit, have the composition $BaSiO_3 + 7H_2O$. They may be preserved unaltered for a considerable length of time in air or water at ordinary temperatures, but are decomposed by boiling water. The crystals, which are orthorhombic, lose their water at a little above 100°, and acquire a turquoise-blue color. They may be easily obtained by suspending calcined silica in baryta water. At the end of some days the sides of the vessel are covered with microscopic crystals, having the crystallographic character of those previously described. Since these crystals are deposited on the sides as well as on the bottom of the vessel, the silica must have been dissolved in the baryta water. No corresponding natural silicate is known.—Jour. Chem. Soc., August, 1881, p. 683; from Compt. Rend.

CALCIUM.

Basic Carbonate of Calcium—Production and Characters.—Mr. F. M. Raoult obtains a bibasic carbonate by passing carbonic acid over dry calcium oxide at dull redness. The compound differs from a mixture of lime and of the neutral carbonate by certain properties. If exposed to the vapor of water it does not become hydrated, and if moistened with water it sets like a hydraulic cement without heating.

—Chem. News, July 29th, 1881, p. 60; from Compt. Rend., No. 25, 1881.

Crystallized Double Sulphate of Calcium and Sodium—Formation.—C. W. Folkard has observed that during the evaporation of the liquor formed by the double decomposition of acetate of calcium and sulphate of sodium, in the Welsh process of manufacturing acetate of sodium, a salt separates out in the form of micaceous spangles, which are greasy to the touch, like steatite, and have a composition corresponding to the formula $CaNa_2(SO_4)_2$. On gently igniting the salt is unchanged, but on heating to bright redness the crystalline form is destroyed. It is insoluble in alcohol and in concentrated solutions of acetate of sodium, but is decomposed by weak solutions and by water. The formation of this salt may explain why sulphate of calcium obstinately retains sulphate of sodium in double decomposition, which is only partially extracted even by boiling water, and is a source of considerable loss in certain manufacturing operations.—Jour. Chem. Soc., July, 1881, p. 509; from Chem. News, 43, p. 6.

MAGNESIUM.

Magnesia—Industrial Production.—A writer in Compt. Rend. (July 25, 1881) communicates the following: If we cause a solution of magnesium chloride to be absorbed by dry slacked lime, the magnesia set at liberty plays the part of a cement, and the matter may be moulded into small porous fragments. If one of these fragments is suspended in a solution of magnesium chloride after some days the lime is entirely substituted by hydrate of magnesia. The fragment has been the seat of a double diffusion; the magnesium chloride has diffused itself from without to within and is changed in the fragment into calcium chloride, which in turn becomes diffused from within to without. These two diffusions are simultaneous and come to an end when all the lime has been substituted by the magnesia. Here, then, is a means of reducing into a small volume a precipitate which would have occupied the entire bulk of the solution, if the fragment of lime had been stirred up in it at first. The same phenomena are produced if a great number of such fragments are heaped up in a suitable vessel, where a solution of magnesia is made to circulate slowly from the top to the bottom. In five or six days the conversion is complete; the solution may be replaced by water and the magnesia washed completely. On stirring up it becomes a white pulp, which, if dried in the air, gives a very friable mass. It is hydrated magnesia, which may remain for a long time exposed to the air without becoming notably carbonated. Its purity depends on that of the lime employed. In working on a large scale the author uses a paste of lime, which he forces through a plate of metal pierced with small holes, so as to eliminate stones and unburnt pieces. If these "worms" fell upon the ground, or into water, they would at once return to their pasty state. He, therefore, receives them in a solution of magnesium chloride, where they become at once covered with a slender coating of magnesia, which consolidates them so well that they may be heaped up to a height of 1.50 meter, still leaving between them the insterstices needful for the circulation of the liquid. The paste of lime should contain from 34 to 36 per cent. of anhydrous lime. The solution of magnesium salt should contain from 25 to 40 grams of anhydrous magnesia per liter. The presence of chloride of sodium is indifferent, but soluble sulphates must be removed, which may be done by adding the water of a former operation, rich in calcium chloride, and allowing the calcium sulphate to settle, etc.—Chem. News, September 23, 1881, p. 159.

Mr. T. Schlœsing proposes to obtain magnesia from sea-water by means of lime. After precipitation and settling for a day, 1 cubic meter of sea-water yields a gelatinous precipitate of magnesia occupying the bulk of 80 liters. He mixes with the magnesia mud a calculated quantity of phosphoric acid in dilute solution, and thus obtains a precipitate of tribasic magnesium phosphate, which condenses on settling, is capable of being collected on a cloth, or on the filter press, and in a few minutes combines with ammonia to form an ammonium-magnesia phosphate.—Chem. News, September 30, 1881, p. 168; from Compt. Rend., August 1, 1881.

Magnesia—Improvement in Preparation.—The methods hitherto employed for the industrial production of magnesia from the chloride have yielded very unsatisfactory and expensive products. Mr. Closson has now solved the problem of its cheap production in a condition of great purity. The crude chloride is treated, not with burnt lime, but with burnt dolomite. In this natural combination the chlorine of the lye combines completely with the lime of the dolomite, so that if the latter is used in a state of purity—as it is readily procurable—a magnesia of 98 to 99½ per cent. can be made on the large scale without difficulty. The value of the process cannot be overestimated, since magnesia is becoming of great importance in the manufacture of cements, artificial stones, fireproof bricks, furnace linings, retorts, etc., and many of these applications have been limited on account of its high price. It is expected that as absolutely fireproof furnace linings, crucibles, etc., can be procured by its use, the use of the oxygen blast will assume a practical form, and that the way will be opened for great improvements in metallurgy.—Chem. News, August 12, 1881, p. 76.

Heavy Magnesia—New Process of Preparation.—Dr. P. E. Alessandri proposes the following method, which is both simple and rapid, for preparing the "heavy" calcined magnesia:

Take ordinary calcined magnesia, free from carbonate, moisten it, in a mortar, with pure, absolute alcohol, and triturate it, at first gently, afterwards with some force, but not rapidly. During the agitation the magnesia is to be moistened three or four times with fresh portions of the alcohol, and the operation is suspended when the bulk of the magnesia appears to remain stationary. To remove the mass, dry it, rub it to powder, and pass it through a sieve.

The product occupies only about one-fifteenth of the original bulk. —New Rem., March, 1882, p. 91; from Toscana Indust., in Bolletino Farmaceut. (Milano), xxi, 42.

Carbonate of Magnesium—Composition.—Very careful and comprehensive experiments, made by Mr. K. Kraut, prove that carbonate of magnesium, whether prepared by double composition or from the bicarbonate, contains 4 mol. CO_2 to 5 mol. MgO. At 100° it loses, with the water, some carbonic acid, and the residue does not indicate a simple formula. By continued boiling, with repeated renewal of the water, the carbonic acid can be reduced to the proportion $4MgO.3CO_2$, but it cannot, under these conditions, be reduced to the proportions required by the formula $7MgO\ 5CO_2$. The older statements, particularly those of Fritzsche, are, therefore, confirmed.—Archiv d. Pharm., March, 1882, pp. 180–187.

Sulphate of Magnesium—Estimation of Sulphate of Sodium if Present.—Hager proposes the following: 2 grams of sulphate of magnesium, 1.5 gram of oxalic acid, and 20 c.c. of water are heated in a flask until solution is effected; 5 c.c. of caustic ammonia are added, and the heat is continued to boiling; 0.5 gram of oxalic acid is now added to render the liquid strongly acid, and the boiling is continued for 1 or 2 minutes. The mixture is filtered hot, the filter washed with hot water, containing a little oxalic acid, and the filtrate and washings are evaporated to dryness and heated to redness. The residue is anhydrous sulphate of sodium, which, multiplied by 2.27, give the quantity of crystallized Glauber's salts present in the Epsom salts. The oxalate of magnesia on the filter may be converted into magnesia by heating to redness.—Archiv d. Pharm., October, 1881, p. 299; from Pharm. Centralh., 1881, No. 24.

ALUMINIUM.

Alumina—Separation from Ferric Oxide.—H. Beckmann shows that the caustic alkalies used for this purpose are contaminated with silica, alumina, and organic matter, which render the separation uncertain. He proposes the use of baryta water, which, contrary to the earlier statement of Vauquelin, dissolves alumina completely, and has the advantage of not acting on silica.—Chem. News, November 4th, 1881, p. 226; from Chem. Industrie.

Iodide of Aluminium—Preparation.—According to G. Gustavson, a solution of iodide of aluminium in bisulphide of carbon or benzene, may be readily obtained by mixing iodine and metallic aluminium in scraps, with three times their weight of the solvent in a tightly corked flask, kept cool by being placed in water, and allowing the mixture to stand three or four days with occasional agitation.—Jour. Chem. Soc., April, 1882, p. 364; from Bull. Soc. Chim. (2), 36, p. 556.

Sodium Alum—Native Occurrence in Japan.—Professor Edward Divers draws attention to the occurrence of native sodium alum in Japan. Hitherto this substance has been found as a mineral (Mendozite) in South America, at St. Juan, near Mendoza. The Japanese article occurs as an efflorescence on decomposing sodium felsite (albite), with pyrites scattered through it, in the province of Itzumo, not far from the coast. Its composition, as determined by Mr. J. Mori, is as follows: Alumina, 11.27; soda, 7.26; sulphuric oxide, 34.73; water (by difference), 46.74. It follows from this that soda alum occurs in nature of the normal type with twenty-four molecules of water. —Chem. News, November 4th, 1881, p. 219.

FERRUM.

Iron—Limit of Reactions for its Presence.—See *Ferrocyanide of Potassium.*

Ferrous Sulphate—Preservation.—The observations of Johanson (see Proceedings, 1881, p. 263), that crystallized ferrous sulphate keeps best in not hermetically closed vessels, is explained by W. Rietzel as being the result of adhering moisture. The crystals of this salt, and notably that obtained by precipitation with alcohol, if thoroughly dried, keep very well in a dry atmosphere and in closed vessels, but not in moist air, when hydrogen dioxide is formed and the oxidation of the salt facilitated. Ferrous sulphate containing $6H_2O$ is not oxidized in contact with air.—Am. Jour. Pharm., June, 1882, p. 307; from Pharm. Centralhalle, 1882, p. 130.

Ferrous Salts—Oxidation.—J. Y. Buchanan shows in an interesting paper that the present ideas concerning the influence of the presence of oxidizing agents on a solution of ferrous salt are very erroneous. Three solutions of ferrous sulphate were prepared: of the first, 10 c.c. contained 0.0407 gram Fe; of the second, 10 c.c. contained 0.062 gram Fe; and of the third, 10 c.c. contained 0.1 gram Fe; of the chlorate of potassium solution, 10 c.c. contained sufficient chlorate to oxidize

0.1 gram Fe from the ferrous to the ferric state. Solutions of nitrate of potassium and permanganate of potassium with sulphuric and hydrochloric acids were employed. It is generally supposed that titration with permanganate, in presence of strong hydrochloric acid, cannot be accomplished correctly, but the author shows that it is perfectly possible to obtain correct results, if the permanganate is added so as to avoid local supersaturation, as all the iron is oxidized before any euchlorine is formed, and the point of completion can be indicated by the addition of a little ferrocyanide of potassium, so as to produce a blue coloration only, which disappears directly all ferrous salt is oxidized. The table of experimental results shows that, with the addition of 10 c.c. of fuming hydrochloric acid, as good results are obtained as when sulphuric acid was employed. The presence of chlorate or perchlorate of potassium does not immediately affect the results at ordinary temperatures. Also at ordinary temperatures, neither perchlorate nor nitrate of potassium has any appreciable effect, although allowed to be in contact for several hours, whilst it is only after the lapse of an hour that the chlorate acts on the ferrous salt. At the boiling-point, nitrates and perchlorates are not detrimental; but not so the chlorate. Dilution of the chlorate solution reduces its influence, for below 7 per cent. it seems to have no effect.—Jour. Chem. Soc., June, 1882, p. 572; from Proc. Roy. Soc. Edin., 11, pp. 191–198.

NICKEL.

Nickel and Cobalt—Separation from Iron.—Mr. Thomas Moore has found the following process for the separation of nickel and cobalt from iron to be very serviceable. If the solution contains much free acid, this should be removed by evaporation, and dissolving the residue in water. To the solution so obtained, a quantity of ammonic sulphate should be added, sufficient to form a double sulphate with the nickel and cobalt present. Dilute to about 150 c.c., and then add rather a large excess of oxalic acid and stir well. If a precipitate appears, more ammonia sulphate must be added until a clear solution is obtained. Ammonia water is now added in considerable excess; stir, heat gently for a few minutes, and filter; wash well with water containing ammonia. The solution is now ready for electrolysis or any other method of estimating the nickel or cobalt the chemist may desire. Instead of filtering after the addition of ammonia water, etc., the mixture may be diluted to say 500 c.c., and after allowing the precipitate to settle, a given portion of the clear liquid may be withdrawn. In either case a further quantity of ammonic sulphate should be added to the clear liquid, to lessen the resistance of the solution to the electric current. The process the author believes to be quite new.—Chem. News, August 12, 1881, p. 76.

CHROMIUM.

Chrome Iron Ore—Occurrence in a State of great Purity in Japan.—Prof. Edward Divers draws attention to a chrome iron ore, which occurs in masses at Oïta, Japan, and which is shown by the analyses, made by Mr. T. Haga, to agree almost perfectly in its composition with that of pure ferrous chromite, as regards the ratio of iron oxide to chromium oxide. This ratio, in three analyses, is as follows:

	I.	II.	III.
Chromic oxide,	59.39	59.20	59.30
Ferrous oxide,	28.32	28.22	28.27

And the composition of the mineral may be given as follows:

Chrome-iron oxide,	87.30
Magnesite,	0.29
Magnesia,	9.17
Silica,	1.58
Alumina,	0.80
	99.14

No such pure ore has hitherto been recorded as occurring, unless possibly in the papers of Christomanos, which the author has only seen in the abstract.—Chem. News, November 4, 1881, p. 217–218.

Sulphochromites—Formation, etc.—Mr. Graeger has already prepared the sulphochromites of zinc, iron, and manganese, by heating a mixture of the hydrated oxides of chromium and zinc, etc., with sulphur. These compounds are dark-brown or black powders, insoluble in water and in hydrochloric acid, but soluble in nitric acid and aqua regia. He now describes the preparation and properties of several other sulphochromites. Sulphochromite of sodium ($Na_2Cr_2S_4$) is obtained like the zinc salt. It is a dark brick-red amorphous powder, which is not altered in the dry state unless heated, but is oxidized when intimately triturated with water, becoming blackened thereby. It is insoluble in water, not attacked by strong HCl, but dissolves in nitric acid and aqua regia in the cold, and by dilute nitric acid when heated. All attempts to prepare the sulphochromite of potassium were unsuccessful. Sulphochromites of the heavy metals are obtained by precipitating the sodium salt with various metallic solutions. The iron, manganese, zinc, tin, lead and silver salts can be thus prepared, and the three first named exhibit a darker color than when prepared directly from the components, though they are in other respects identical. The sulphochromites of barium, strontium, and calcium cannot be prepared from the sodium salt by double decomposition. The existence of sulphochromites shows that chromic sulphite, Cr_2S_3, reacts with the sulphides of many metals in the same manner as chromic oxide with the corresponding oxides.—Jour. Chem. Soc., January, 1882, p. 15–17; from Monatsch. Chem., 2, p. 266, 275.

ZINCUM.

Zinc—Convenient Form suited for Analytical Uses.—C. Mann melts the zinc at a low temperature over the gas-flame in a porcelain crucible, or in a muffle-furnace in earthen crucibles, in each of which some borax ought to be previously melted so as to glaze the inner surface. The melted metal is poured in small quantities upon a polished flagstone inclined at an angle of 25° to 30°. In this manner the metal is obtained in long narrow bands, perfectly free from oxide, very brittle, and crystalline in texture.—Chem. News, June 30th, 1882, p. 287; from Zeitschr. f. Anal. Chem., xx., No. 4.

Zinc-dust—Presence of Sulphur.—This substance being used very frequently in analyses, A. Wagner draws attention to the frequent presence of appreciable quantities of sulphur. Two samples examined by him have revealed the presence of 0.12 per cent. and 0.011 per cent. sulphur. Another sample, offered as chemically pure, contained 0.004 per cent. of sulphur.—Arch. d. Pharm., November, 1881, p. 360; from Zeitschr. f. Anal. Chem., xx., No. 4.

Oxide of Zinc—Preparation by Precipitation.—Mr. R. F. Reynolds, after drawing attention to the characters of two samples of commercial oxide of zinc, one of which, though claimed to have been made by the combustion of the metal, contained sulphuric acid equivalent to 2.455 per cent. of anhydrous sulphate of zinc, gives the details of some experiments made with a view to determining the availability of the wet method for the preparation of a pure article. He concludes that by the use of a relatively large quantity of alkali, and the employment of a filter-press to overcome the tediousness of filtering the bulky precipitate, a practically pure product could doubtless be obtained. But the great purity of one of the samples of commercial oxide is regarded by the author as a strong recommendation of the process of combustion.—Yearbook of Phar., 1881, pp. 439–440.

Calamine—Occurrence in Italy.—Mr. Consul Colnaghi reports that calamine is found in Sardinia in large quantities in silurian limestone containing masses of galena. The mines of Malfidano, on the west coast of the island, in the district of Iglesias, are the most abundant, and furnish little less than half the total production of the island. The calamine, as is usual, is found in nodular veins. Zinc ores are also met with in Lombardy in the same geological formation in which the galena of Valsassina is found, the dolomitic limestones of the trias. The calamine of Lombardy is an almost pure carbonate of zinc, and was formerly used by the Milanese artisans in the manufacture of brass.—Phar. Jour. Trans., December 3d, 1881, p. 460.

CADMIUM.

Cadmium—Separation from Zinc, and Determination.—According to Mr. Kupfferschlaeger a complete separation of cadmium from zinc can be effected in a few hours by simply plunging a slip of bright zinc into the mixed solution in a test-tube, and leaving it there until all apparent action has ceased, decanting the liquid, washing the deposit of cadmium first with boiled water and then with alcohol, drying with exclusion of air, and weighing. The author operates on a neutral solution of the sulphates, previously heated to expel air. The test-tube is loosely stoppered.—Chem. News, October 28th, 1881, p. 215; from Bull. Soc. Chim. de Paris, No. 11, 1881.

Cadmium—Separation from Copper.—According to G. Vortmann the dilute solution (sulphuric or hydrochloric) of the metals is mixed with hyposulphite of sodium till completely decolorized, and is then heated to a boil, when the copper is separated as a heavy black sulphide. The boiling is continued until the liquid has become clear. After filtration and careful washing the sulphide of copper is mixed in the known manner with sulphur, and heated in a current of hydrogen. The cadmium in the filtrate is precipitated by one of the known methods.—Chem. News, February 3d, 1882, p. 57; from Zeitschr. f. Anal. Chem., xx., No. 3.

PLUMBUM.

Lead—Determination in Tin.—Mr. Roux gives the following quick process for the determination of lead in samples of tin. The metal is laminated, and 2.5 grams are dissolved in 15 c.c. nitric acid in a flask marked at 250 c.c. The nitrous vapors are expelled by boiling, and after 40 c.c. of a saturated solution of acetate of sodium are added, it is diluted to 250 c.c., and the stannic acid is allowed to deposit. 100 c.c. of the clear supernatant liquid, corresponding to 1 gram of the metal, are treated with 10 c.c. of a titrated solution of bichromate of potassium containing 7.13 grams per liter, and, after the chromate of lead has been deposited, 10 c.c. more are added, and so on till the liquid is colored yellow by the excess of bichromate. The liquid is filtered, the precipitate washed, and the excess of bichromate determined by a solution containing 57 grams of double sulphate of iron and ammonium and 25 grams of sulphuric acid. This liquid is preserved in a sort of a wash-bottle under a layer of petroleum or benzol. Nevertheless its standard must be frequently verified. To ascertain the excess of bichromate employed spots are made upon a white porcelain.

plate with a very dilute solution of ferricyanide of potassium preserved in a black bottle. As long as there is not an excess of ferrous oxide in the liquid, the spots retain their reddish-yellow color, but as soon as the bichromate is completely reduced the spots take a tint, green at first, and then blue. If the liquid does not appear red after titration with iron, enough acetate of sodium has not been added.—Chem. News, October 28th, 1881, p. 215; from Bull. Soc. Chim. de Paris, No. 11, 1881.

Peroxide of Lead—Determination of Value.—Mr. H. Fleck recommends the following process: A weighed quantity is placed in a small flask fitted with a gas delivery-tube, and decomposed with dilute hydrochloric acid. The chlorine evolved is passed into a solution of iodide of potassium. When the escape of gas has ceased the solution of the iodide is titrated with hyposulphite of sodium, and the percentage of peroxide of lead is calculated from the quantity of iodide that had been liberated. In rich samples the moisture should be determined specially.—Chem. News, November 4th, 1881, p. 226; from Chem. Industrie; Rep. Anal. Chem.

Sulphate of Lead—Solubility.—According to an observation of Dr. K. Stammer, the precipitate resulting on the addition of basic acetate of lead to a solution of a soluble sulphate, is completely redissolved on the addition of an excess of the precipitant. Upon the addition of acetic acid the sulphate is again precipitated. Sulphate of lead is therefore soluble in basic but not in neutral acetate of lead.—Arch. d. Pharm., March, 1882, p. 209; from Chem. Ztg., 1882, No. 4.

STANNUM.

Tin—Detection in Presence of Antimony.—Mr. M. M. Pattison Muir proposes a test for tin, in the presence of antimony, which is founded on the fact that stannic chloride is reduced to stannous chloride by boiling with metallic copper. The precipitated sulphides of the arsenic group are warmed with concentrated hydrochloric acid; the insoluble portion is washed and tested for arsenic by Bunsen's film test. The solution is somewhat diluted; about three-fourths of it is boiled for *at least ten minutes* with copper turnings (which must of course be free from tin), poured off from the copper, and tested for stannous chloride. The remaining smaller portion is poured on to a piece of platinum surrounded by a piece of zinc-foil. If the platinum become covered with a black deposit it is removed and examined in the ordinary way.—Chem. News, February 17th, 1882, p. 69.

TUNGSTEN.

Tungstoborates—Characters.—D. Klein has prepared and examined the tungstoborates of different metals: Cadmium, cobalt, nickel, copper, manganese, chromium, lead, uranium, thallium, silver, and cerium.

Tungstoboric Acid may be readily obtained in yellowish octahedrons by decomposing dibarium tungstoborate with exactly the required amount of sulphuric acid. It gives a solution of very high specific gravity, and probably has the composition, $9WO_3,B_2O_3,2H_2O + 18$ Aq. With the salts of quinine, cinchonine, strychnine, and morphine, it gives white or yellowish-white precipitates, insoluble in acids in the coid.—Jour. Chem. Soc., January, 1882, pp. 17–18; from Bull. Soc. Chim. (2), 36, pp. 205–209.

MOLYBDENUM.

Silico Molybdic Acid—Characters, etc.—Mr. F. Parmentier has isolated silico-molybdic acid, perfectly crystallized, in the shape of yellow cubo-octahedra, without action on polarized light. They melt at about 45° in their water of crystallization, and are decomposed below 100°. The acid is very soluble in water and in dilute acids, and forms crystalline salts with bases. Alkaline carbonates and ammonia in excess decompose it with a precipitation of silica. It resembles phospho-molybdic acid in color and crystalline form, but it is less stable. While phospho-molybdate of ammonium is insoluble, silico-molybdic acid gives no precipitate with ammoniacal salts, except in very concentrated solutions. Phospho-molybdic acid gives an insoluble compound with potassa, whilst silico-molybdic acid gives no precipitate, even in the most concentrated solutions of potassium salts. Salts of cæsium and rubidium, even when present in small quantities with other alkaline salts, may be detected by means of silico-molybdic acid. The silico-molybdate of rubidium is slightly soluble, whilst the corresponding cæsium salt is totally insoluble, by which means the two may be separated —Chem. News, February 24th, 1882, p. 87; from Compt. Rend., January 23d, 1882.

BISMUTHUM.

Bismuth—Occurrence in Bolivia.—According to Y. Doneyko, Bolivia is the richest of all countries in bismuth. The quantities found in Peru and Chili are comparatively small. The ores are usually associated with tin-stone and sometimes with silver and gold, and consist of sulphides, oxides, and metallic ores, as follows:

1. *Sulphur Ores.—Bolivite.* $Bi_2S_3.Bi_2O_3$, apparently rhombic, found at Tazna. *Bismuth glance* occurs chiefly at Chorolque, near Tazna. *Bismuth copper sulphide*, from the mines of Cerroblanco, in the Chilian province of Atacama. *Bismuth silver sulphide*, found by Pflücker in the Santa Matilda de Morococha mine in Peru.

2. *Oxides—Taznite.*—Chlorarsenate and chlorantimonate of bismuth occurs at the outcrop of the veins. *Bismuth Hydroxide.* Compact

and earthy, the most abundant of the Bolivian bismuth ores. *Hydrated Bismuth Silicate* accompanies the bismuth-glance of Chorolque.

3. *Metallic Ores—Native Bismuth.*—Of rather frequent occurrence in Bolivia; found, together with oxysulphide, at Tazna; contains no tellurium. In other localities it is associated with gold, telluric bismuth, and bismuth silver.—New Rem., January, 1882, p. 21; from Annales des Mines (7), pp. 18, 538.

ARSENICUM.

Arsenic—Detection of Small Quantities in Sulphur.—Mr. H. Schæppi recommends that 10 grams of sulphur, pulverized as finely as possible, be covered with water and a few drops of nitric acid, digested for some time, filtered, and washed until the washings no longer have an acid reaction. Thus chloride and sulphate of calcium are removed, and sulphide of calcium, if present, is destroyed. The sulphur is now covered with water at 70° to 80°, a few drops of ammonia are added, and the mixture is digested for a quarter of an hour. All the arsenic present as sulphide is dissolved, and the ammoniacal liquid is variously treated, according to the degree of accuracy required. For perfectly accurate determinations the ammoniacal solution is mixed with nitrate of silver, and all the sulphur present in the state of sulphide of arsenic is thrown down as sulphide of silver, acidified with nitric acid, filtered, and washed. The precipitate of sulphide of silver is dissolved in hot nitric acid, and determined as chloride, and from the weight of the latter the sulphide of arsenic is calculated. As a less accurate but more rapid method, the ammoniacal solution of sulphide of arsenic is cautiously neutralized with pure diluted nitric acid, and considerably diluted. It is then titrated with decinormal nitrate of silver till a drop of the solution is turned brown with neutral chromate. The arsenic is calculated from the quantity of nitrate of silver consumed. For very rough determinations it is sufficient to treat 10 grams of the finely-powdered sulphur with nitric acid, to extract with ammonia, and to add nitrate of silver. From the intensity of the color or the quantity of the precipitate of sulphide of silver, it may be judged if the sulphur is approximately free from arsenic or strongly contaminated.—Chem. News, February 3d, 1882, p. 58; from Die Chem. Industrie, iv., No. 10.

Arsenic Sulphides—Compounds with Iodine.—On carefully heating equal molecules of arsenic disulphide, As_2S_2, and iodine, R. Schneider observed rapid liquefaction to a brown-red liquid, congealing to an amorphous glassy mass of the same color, probably AsI_3,As_2S_3. Neither alcohol, carbon bisulphide, or chloroform dissolves iodine.

Arsenic trisulphide and iodine, in the proportion of $As_2S_3+I_4$, melt, likewise, to a red-brown liquid, which congeals to a somewhat crystalline, scarlet-red mass, probably $2(AsI_3.As_2S_3)+3SI_2$. This is readily soluble in hot carbon bisulphide, with a yellowish-brown color.—From Jour. f. Prakt. Chem., xxiii., p. 486; through Chem. Ztg., 1881, No. 21; in Am. Jour. Phar., August, 1881, p. 407.

Iodide of Arsenic—Preparation and Characters.—Eugene Bamburger and Jul. Philipp, after reviewing the processes of Hautefille, Wiggers, Goepel, and Nicklès, recommend the process of Nicklès as the best for the production of iodide of arsenic (AsI_3). Arsenic and iodine, in equivalent proportions, are heated together with carbon-disulphide in a flask, provided with an upright condenser, until the iodine color disappears. The solution is then evaporated to the crystallizing-point. By a single recrystallization the product may be obtained pure.

To the properties of teriodide of arsenic, hitherto known, the following are to be added: It is easily soluble in all usual solvents (alcohol, ether, chloroform, benzol, disulphide of carbon); but difficultly soluble in hydrochloric acid. When heated in contact with the air, it takes fire and burns to arsenious acid. The great tendency of the teriodide to take up oxygen, to separate iodine, and generate arsenious acid—which tendency is shown already by the spontaneous loss of a little iodine on keeping the compound, even in the cold—may be nicely shown by heating it to boiling in a bulb-tube, through which a stream of dry oxygen is passed. Combustion ensues, with a fine violet-colored flame, lasting until the compound is completely consumed. If the operation is well conducted, the walls of the bulb are covered with white arsenious acid, while the separated iodine is deposited near the further end of the tube in black prisms.

Though the compound is readily decomposed by oxygen (also by sulphur), yet it shows remarkable resistance toward other reagents. Its natural color is red, but it dissolves in water to a colorless liquid, which undoubtedly contains hydriodic and arsenious acids, and from which it is recovered in its former condition, and without sensible loss of iodine, on evaporating the solution. This resistance to the decomposing action of water, and its stability towards, and slight solubility in hydrochloric acid, afford a means of readily preparing the salt by precipitation from its aqueous solution. If a hot solution of arsenious acid in hydrochloric acid be mixed with concentrated solution of iodide of potassium, the teriodide separates as a reddish-yellow crystalline powder, and may be obtained chemically pure by washing it with hydrochloric acid, of sp. gr. 1.120, until a sample of the washings, on evaporation, ceases to leave a residue of chloride of potassium. The solution, on cooling, deposits a further quantity of the salt in darker-colored hexagonal plates. This process affords 85 per cent. of the theoretical yield. The missing 15 per cent. may be recoved from the filtrate by ether.

Teriodide of arsenic absorbs large quantities of ammoniacal gas, and thereby becomes white. If ammonia be passed through the red-brown solution of the salt in ether or benzol, the solution becomes colorless, and a voluminous white precipitate is thrown down, which contains 71.87 per cent. of iodine (mean of two experiments). The formula, $2AsI_3+9NH_3$ requires 71.48 per cent.

If teriodide of arsenic, or a mixture of the components, be heated with alcohol to 150° C. (302° F.), iodide of ethyl is produced. At the same time the arsenious acid is separated in form of small white plates of a silvery lustre.—New Rem., March, 1882, p. 88, from Ber. d. Deutsch. Chem. Ges., 1881, p. 2643.

ANTIMONIUM.

Arsenate of Antimony—Preparation.—The following formula has been adopted by the Dutch Society for the Advancement of Pharmacy: Tartrate of antimony and potassa, 1 part; boiling distilled water, 8 parts; solution of arsenic acid (see under "Liquores") q. s. (about 35 parts). Dissolve the tartrate in the boiling distilled water, and add the solution of arsenic acid until no more precipitate is produced. Heat the mixture to 100° C., then collect the precipitate on a filter, wash it with distilled water, until the washings, when supersaturated with ammonia, are no longer rendered cloudy by magnesium mixture, and dry the product between 30° and 40° C. The product is a white amorphous powder, easily soluble in hydrochloric acid, less so in dilute nitric or sulphuric acid, nearly insoluble in water or alcohol.—New Rem., January, 1882, p. 10.

Antimony—Volumetric Determination in Presence of Tin.—Mr. E. F. Herrown recommends the following process which he has found quite successful, and which depends upon the fact that antimonic chloride is reduced to antimonious chloride by hydriodic acid, with consequent liberation of iodine, whilst stannic chloride is unreduced. The alloy, in a state of fine division, is dissolved in strong hydrochloric acid with the aid of heat, and with frequent additions of small quantities of chlorate of potassium. After the whole of the metal is dissolved a small piece of chlorate of potassium is added to insure the conversion of the antimonious into antimonic chloride, and the solution gently boiled until all the oxides of chlorine have been expelled. The solution is then allowed to cool, and a slight excess of strong solution of iodide of potassium added. The free iodine is then estimated by means of standard solution of hyposulphite of sodium. The amount of iodine found, multiplied by 0.48031, will give the amount of antimony present. Iron, or other metal whose perchloride is capable of liberating iodine, must be removed if present.—Chem. News, March 10, 1882, p. 101.

Schlippe's Salt (Sulphide of Antimony)—Preparation.—See *Sapo Stibiatus*, under "Pharmacy."

HYDRARGYRUM.

Amalgams—Chemical Constitution.—The amalgams are by some regarded as isomorphous mechanical admixtures, but more frequently as definite chemical compounds. Messrs. V. Merz and W. Weith have now made a series of experiments to determine the nature of amalgams. The results of these are by no means conclusive, but the behavior of some of the amalgams, particularly those of sodium and potassium, point very decidedly to their chemical nature. When these are heated at the temperature of boiling sulphur, or in a current of gas, the mercury contained in them is volatilized very slowly, while if they were mere mixtures, the volatilization should be quite rapid.—Archiv d. Pharm., September, 1881, p. 214; from Ber. d. d. Chem. Ges., pp. 14, 1438.

Mercury—Spontaneous Oxidation.—Mr. Berthelot finds that perfectly pure dry mercury, exposed to the air at 10° in a place free from the fumes of the laboratory, and covered with paper to keep off the dust, becomes slowly covered with a pellicle of mercurous oxide, which is reproduced if removed. Hence mercury, like iron, zinc, cadmium, lead, copper, and tin, undergoes a superficial oxidation on exposure to air.—Chem. News, September 30, 1881, p. 169; from Bull. Soc. Chim. de Paris, No. 9, 1881.

Mercury—Detection in Liquids.—Professor Merget, in Bordeaux, recommends the following very simple procedure for the detection of mercury in liquids. A bright rod of copper, or a copper plate, is dipped into the liquid to be examined, and allowed to remain therein the longer the smaller the amount of mercury. A strip of paper is previously prepared, by rubbing it with cotton which has been impregnated with an ammoniacal solution of nitrate of silver, and subsequently allowed to dry. The copper plate is then removed from the liquid, dried by pressing it between bibulous paper, and inclosed in doubly folded silk paper, which is then covered by the reagent paper and kept in position by allowing a book or other object to rest upon it. The reaction is rendered evident upon the silk paper, without the direct contact of the metal, and after a few minutes a deposit of silver is formed upon the paper, and which corresponds to the length of the copper plate which has been immersed in the liquid. By means of this extremely sensitive reaction mercury may be detected in the blood of small animals which have been slowly destroyed by exposure to mercurial vapors, as also with certainty in the urine of syphilitic persons, who have been subjected to mercurial treatment.—Amer.

Jour. Pharm., May, 1882, p. 220; through Chem. Ztg., No. 18, p. 132, 1882; from Jour. de Med. de Bordeaux, 1881, p. 339.

Yellow Oxide of Mercury—Causes of Difference in Color, etc.—J. Comere, noticing that many commercial samples of precipitated oxide of mercury differed in depth of color, made some experiments to ascertain the cause of this difference. As is well known, the oxide is prepared by treating a solution of bichloride of mercury with an excess of caustic potassa, carefully washing the precipitate, and drying it at a gentle heat. It is quite necessary to employ an excess of the alkali, so as to obtain a product free from oxychloride.

If the conditions are modified, the following results are obtained:

1. On employing solutions of bichloride of mercury and of caustic potassa, at the ordinary temperature, the product has a bright-yellow color.

2. If the solution of bichloride is at a temperature of 50° to 60° C. (122°–140° F.), and the solution of potassa at the ordinary temperature, the product has an orange color.

3. If the mercurial solution is boiling, and the alkaline solution at the ordinary temperature, the product is darker in tint than the preceding.

4. If both solutions are brought together boiling, the deepest tint is produced.

A darker tint may also be imparted to the bright-yellow oxide prepared by cold precipitation, if it be boiled with a large quantity of water. The longer the boiling, the deeper will be the tint.

Brownish specimens of the oxide probably always owe this tint to the presence of oxychloride. At least the author found the latter in all dark-colored specimens.—New Rem., May, 1882, p. 149; from Rép. de Pharm., 1881, p. 199.

Yellow Oxide of Mercury—Impurity.—C. Bernbeck has examined a commercial precipitated mercuric oxide which contained 7 per cent. of calomel. It was completely volatilized by heat, but on treatment with hydrochloric or nitric acid left a white insoluble residue consisting of mercurous chloride.—Am. Jour. Pharm., June, 1882, p. 309; from Pharm. Ztg., 1882, p. 32.

Calomel—Stability.—Woellmer has examined powders and pills, kept for a period of thirty months, in the dark, in diffused daylight, in dry and in a damp atmosphere. The calomel was combined with sugar, both pure and whitened with ultramarine, with milk-sugar, gum-arabic, aloes, licorice root, and marshmallow root. Neither the formation of corrosive sublimate nor of ammonio-chloride of mercury could be observed. For the solution of the former, sulphuretted hydrogen was employed as the chief test. The absence of ammoniated mercury was proven by treating the insoluble portion with dilute nitric acid, and testing the filtrate with silver nitrate. Decomposition was likewise not observed in a mixture of golden sulphuret of antimony, calomel, and sugar.—Am. Jour. Pharm., June, 1882, p. 309; from Pharm. Ztg., No. 21, 1882.

Calomel—Molecular Weight.—The direct determination of the vapor-density of calomel does not afford the means of deciding conclusively whether a molecule of calomel consists of $HgCl$ or Hg_2Cl_2. Debray's investigations, namely, have shown that calomel, when in vapor, is dissociated, and a mixture of the vapors of Hg and $HgCl_2$ has the same density as the molecule $HgCl$. While Odling assumed that the dissociation was complete, it has been shown by Marignac that it is only very trifling. Now, if a molecule of calomel consisted of Hg_2Cl_2, the density of its vapor—if only slightly dissociated—would have to approach more nearly to the number 16.28 (the figure expressing the density of non-dissociated vapor of Hg_2Cl_2) than to 8.14 (expressing the density of non-dissociated vapor of $HgCl$). The density was found to be, in three experiments, 8.35, 8.21, and 8.23. Fileti has recently determined the vapor-density of calomel in an atmosphere of corrosive sublimate. He found that no dissociation took place, and that the density was, in two trials, 8.01 and 8.30. From this it follows that the correct molecular formula for calomel is $HgCl$.—New Rem., March, 1882, p. 89.

Vermilion—Chinese Method of Manufacture.—Mr. Hugh Maccallum gives the following interesting description of the manufacture of vermilion in one of the largest vermilion works in Hong Kong.

First Step.—A large, very thin iron pan, containing a weighed quantity, about 14 pounds, of sulphur, is placed over a slow fire, and two-thirds of a bottle of mercury added; as soon as the sulphur begins to melt, the mixture is vigorously stirred with an iron stirrer until it assumes a black pulverulent appearance with some melted sulphur floating on the surface; it is then removed from the fire and the remainder of the bottle of mercury added, the whole well stirred. A little water is now poured over the mass, which rapidly cools it; the pan is then immediately emptied, when it is again ready for use. The whole operation does not last more than ten minutes.

Second Step.—The black powder obtained in the first step is placed in a semi-hemispherical iron pan, built in with brick, and having a fireplace beneath, covered over with broken pieces of porcelain. These are built up in a loose porous manner, so as to fill another semi-hemispherical iron pan, which is then placed over the fixed one and securely luted with clay, a large stone being placed on the top of it to assist in keeping it in its place. The fire is then lighted and kept up for sixteen hours. The whole is then allowed to cool. When the top pan is removed the vermilion, together with the greater part of the broken porcelain, is attached to it in a coherent mass, which is easily separated into its component parts. The surfaces of the vermilion which were attached to the porcelain have a brownish-red and polished appearance, the broken surfaces being somewhat brighter and crystalline.

Third Step.—The sublimed mass obtained in the second step is powdered in a mortar to a coarse powder, and then ground with water between two stones, somewhat after the manner of grinding corn. The resulting semifluid mass is transferred to large vats of water, and allowed to settle, the supernatant water removed, and the sediment dried at a gentle heat; when dry, it is again powdered, passed through a sieve, and is then fit for the market.—Pharm. Jour. Trans., December 17th, 1881, pp. 497–498.

ARGENTUM.

Silver—Determination of Traces in Galena by the Wet Method.—J. Krutwig proposes the following method: 20 to 25 grams of the ore are heated in an iron crucible with cream of tartar, soda, and borax, whereby tolerably pure lead—containing, besides iron and sulphur, all the silver in the ore—is obtained. The lead is treated with concentrated nitric acid, free from chlorine; the solution is diluted with water, and filtered to remove sulphate of lead. An excess of soda solution is added to the filtrate, and the mixture allowed to stand. The brown-yellow precipitate, consisting of the hydroxides of lead and iron and the so-called plumbate of silver, is washed with hot water until all alkali is removed, and is then treated on the filter with moderately concentrated ammonia, which dissolves all the plumbate of silver. The solution is evaporated on the water-bath to remove ammonia, and the residue dissolved in nitric acid. From this solution the lead is precipitated by sulphuric acid, and from the filtrate, the silver by hydrochloric acid.—Arch. d. Pharm., April, 1882, p. 299; from Ber. d. d. Chem. Ges., 15, p. 307.

Silver—Separation from Alloys.—The method for the separation of pure silver previously recommended by Solthien (see Proceedings, 1881, p. 280) may, according to the same author, be very materially shortened, the formation of chloride of silver and solution of the same in ammonia being unnecessary. The metals containing silver are dissolved in the smallest quantity of crude concentrated nitric acid. The solution is mixed with a strong excess of ammonia, and filtered into a tall cylindrical vessel, that can be closely stoppered, and into which a strip of bright sheet copper, extending above the surface of the liquid, is introduced. The separation of chemically pure silver begins at once, and is ended very rapidly. The silver is then well washed, first with some ammoniacal water, and finally with distilled water.—Arch d. Pharm.. March, 1882, p. 201.

Silver Salts—Action of Organic Matters.—Dr. Henry Leffmann has made some experiments with the object to utilize, if possible, the well-known action of organic matter upon silver salts for the examination of waters. He purposes to continue his studies in this direction, and, for the present, communicates the following observations:

This silver solution contained only a few grains to the ounce. When not otherwise mentioned, the water was exposed to the sunlight for two hours.

1. Distilled water,	No color.
2. Schuylkill water,	No color.
3. Schuylkill water with 0.1 c.c. urine,	Brown color.
4. Schuylkill water with 0.5 c.c. urine,	Deep-brown.
5. Schuylkill water with 0.02 c.c. urine,	Red-brown.
6. Schuylkill water with 4 grs. raw sugar,	No color.
7. Schuylkill water with 2 grs. stale mash,	Yellowish.
8. Well water, not perfectly pure, but not unfit to drink,	Faint black.
9. Well water, markedly contaminated,	Black precipitate almost immediately.
10. Water from a small stream, quite pure,	No color.

Waters containing small amounts of milk, glucose, and albumen gave no distinct effects. Solution of glue produced a faint brown. All the experiments tended to show that the test was very sensitive to the presence of urine. Some experiments were made with highly dilute solutions of the common active principles.

Quinidia, strychnia, and cinchonidia gave no result. Picrotoxin gave light-yellow; caffeine gave light yellow; quinidine sulphate gave faint brown; morphia gave immediate precipitate.—New Rem., May, 1882, p. 134; from "The Analyst," March, 1882.

Chloride of Silver—Reduction to Metal.—Dr. W. Lagrange finds that the complete reduction of chloride of silver to metal may be easily accomplished by treating it with a solution of ferrous oxalate in (neutral) oxalate of potassium. This solution is digested with the chloride of silver at as high a temperature as possible, after which the reduced silver is carefully washed with water, finally under addition of a little sulphuric acid. It is then fit for all purposes.

The solution of ferrous oxalate, which is used in photography as developer of dry plates, may be prepared in various ways. For instance, by boiling ferrous sulphate with neutral oxalate of potassium, or by dissolving 1 part of ferrous sulphate and 3 parts of neutral potassium oxalate in 12 parts of water. Also in the following manner: Dissolve 75 parts of pure oxalic acid in 400 parts of hot water, gradually add 100 parts of bicarbonate of potassium, and finally 10 parts of finely powdered metallic iron. The whole is set aside for a few hours, being occasionally stirred, until no more hydrogen gas is given off, and the whole then filtered. The filtered solution keeps indefinitely in well-closed vessels. For technical purposes, when it is not important to insist upon chemical purity, cheaper materials may be used, as f. i. common carbonate of potassium, and commercial oxalic acid, in proportionately larger quantities.

If the chloride of silver is much contaminated by foreign impurities, it is first purified by dissolving it in a solution of hyposulphite of sodium. If now a sufficient quantity of the oxalate mixture be added, all the silver is thrown down as a finely divided precipitate, and may be allowed to settle in the well-closed flask.

The oxalate mixture may always be restored to its serviceable condition by adding to it, for every 500 grams of liquid, 15 grams of oxalic acid, 15 grams of bicarbonate of potassium, and 5 grams of powdered iron; the generated hydrogen, in this case, reduces the ferric salt, which was formed, again to ferrous salt.—New Rem., June, 1882, p. 164; from Pharm. Zeit., No. 21.

Argenti et Sodii Hyposulphis (*Hyposulphite of Silver and Sodium*)—*Formula of the Dutch Society for the Advancement of Pharmacy.*—Silver nitrate, 4 parts; sodium chloride, q. s.; sodium hyposulphite, 13 parts; distilled water, q. s.; alcohol (95 per cent.), 256 parts. Dissolve the nitrate of silver in 10 parts of distilled water, and add to it a solution of chloride of sodium as long as a precipitate is produced. Collect the precipitate on a filter, and wash it with distilled water until a drop of the wash-water no longer leaves a residue on evaporation. Add the still moist precipitate to a clear solution of the hyposulphite of sodium in 30 parts of distilled water. When the silver salt is dissolved, add the alcohol, and let the mixture stand for a few hours. Then pour off the supernatant clear liquid, collect the crystals in a funnel, the neck of which is closed by a pellet of cotton, wash them with alcohol, and dry them without heat.

The whole manipulation must be performed in a place not accessible to daylight. (Best in a photographic dark-room.)

The salt is a white, or grayish-white crystalline powder, easily soluble in water, but insoluble in strong alcohol.

The aqueous solution yields, with solution of nitrate of silver, a precipitate which at first has a yellowish-white color, but soon passes to yellowish-red and brownish-black.

The salt must be carefully protected from the light.—New Rem., May, 1882, p. 73.

AURUM.

Gold—Estimation of Small Traces.—Nelson H. Darton has tested numerous methods that have been proposed for the estimation of the minute quantity of gold occurring in certain rocks, in ore trailings, etc., and recommends the following:

Small parts are clipped from all sides of a mass of rock, amounting in all to about a quarter of an ounce. This is finely powdered in a steel mortar and well mixed. About half of it is placed in a capacious test-tube, and then partly filled with a solution made by dissolving 20 grains of iodine and 30 grains of iodide of potassium in about 1½ ounces of water. The mixture thus formed is thoroughly agitated by shaking and warming, and then, after all particles had subsided, dip a piece of pure white filter-paper in it, allow it to remain for a moment, then let it drain, and dry it over the spirit-lamp. It is then placed upon a piece of platinum foil held in pincers, and this heated to redness over the flame; the paper is speedily consumed, and, after heating further to burn off all carbon, it is allowed to cool, and then examined. If at all purple, gold is present in the ore, and the relative amount approximately deduced, as much, fair, little, or none. This method takes but little time, and is very trustworthy.—New Rem., June, 1882, p. 169; from Scientific American.

Chloride of Gold and Sodium—Modified Process.—Mr. Solthien recommends the following modification of the process of the German Pharmacopœia, whereby the preliminary isolation of pure gold is avoided. The gold for this purpose should, however, not contain too much silver, the coin of the German Empire answering well. It is dissolved in the smallest quantity of aqua regia, the solution evaporated in a water-bath at a *gentle* heat, and the excess of acid evaporated as completely as possible. The residue is exhausted with pure ether, and the united ethereal extractions are evaporated in a tared capsule, at first spontaneously, and finally with gentle heat and the addition of very little pure aqua regia. The nearly dry residue is now mixed with one-half its weight of pure chloride of sodium, the mixture is intimately stirred until dry, and then again weighed to determine the correct weight of the chloride of gold. Sufficient chloride of sodium is then added to make its total weight equal to that of the chloride of gold; the mixture is moistened with a little distilled water, and triturated constantly until it is again dry.—Arch. d. Pharm., March, 1882, p. 202.

PLATINUM.

Platinum—Attack of Flame.—A. Rémont observes that the carbonaceous deposit formed on platinum after exposure for some time to an oxidation flame, contains an amount of platinum so small that it is generally neglected, when wiping the base of a crucible blackened in the flame before weighing. On calcining 0.022 gram of a carbonaceous deposit formed on a platinum capsule on exposure for half an hour to a red heat in the upper part of a Bunsen flame, the author obtained 0.01 gram of the metal. Further experiments showed that the corrosion of the platinum is due not to carbon in suspension, but to one or more of the gaseous elements of the flame.—Chem. News, September 30, 1881, p. 169; from Bull. Soc. Chim. de Paris, No. 9, 1881.

NEW METALS.

Actinium—A New Metal found in Zinc Pigment.—In some former notes (Chem. News, vol. xliii, p. 283, and vol. xliv, p. 73) Dr. T. L. Phipson called attention to a new substance to which zinc pigment owes its remarkable property of darkening in the sunlight, returning to its white state in the dark, and not being affected in this manner under a sheet of glass. He has since made a great number of experiments, and has succeeded in isolating the oxide and the sulphide of the new metal in a tolerable state of purity. By the method of its manufacture, an outline of which is given. the zinc pigment consists of sulphide of zinc, oxide of zinc, and sulphate of baryta, with *minute* quantities of iron, lead, arsenic, manganese, etc. The manner by which the author has obtained the oxide and sulphide of actinium from this pigment is as follows: About 15 grams of the finely pulverized substance are left for 24 hours in dilute acetic acid (strongest acetic acid and water equal parts) and the mixture well stirred or shaken occasionally. This takes out most of the iron. manganese, magnesia, lime, and *oxide* of zinc. The residue, after being washed, is treated exactly in the same manner with dilute hydrochloric acid (acid 8 parts, water 92 parts), with the object of completing the action of the acetic acid. The residue, well-washed, is then heated with strong hydrochloric acid, to which a little nitric acid is added from time to time. The solution of the chlorides thus obtained is filtered, to separate the sulphur and the insoluble sulphate of baryta, any remaining sulphur in suspension after filtration being oxidized by a few crystals of chlorate of potash. To this solution, somewhat diluted, a considerable excess of caustic soda is added and the solution heated. The oxide of zinc remains in solution and the white oxide of actinium is precipitated, the latter is washed on a filter, dissolved in hydrochloric acid, and again treated with excess of soda, and this treatment is repeated two or three times to completely eliminate the zinc. Finally, the oxide of actinium, still impure, is dissolved in a considerable excess of hydrochloric acid. The solution is neutralized with ammonia, and then the latter added in excess. All but a little oxide of iron remains dissolved (otherwise this last treatment has to be repeated), which is separated by filtration, and sulphide of ammonium added to the filtrate, which throws down

Sulphide of Actinium as a bulky, pale canary-yellow precipitate. This is insoluble in excess of sulphide of ammonium, scarcely at all in acetic acid, but readily in mineral acids even dilute. When exposed to the direct rays of the sun it darkens and becomes quite black in about 20 minutes; but ordinary window-glass protects it from this change. The quantity obtainable from the zinc pigment amounts to no less than about 4 per cent., and the presence of this enormous amount of this new element in zinc will account probably for the discrepancies noticed in the equivalent of this metal as determined by various observers. Some of the characters of the

Oxide of Actinium have become evident by the above process of preparation. Its hydrate forms a bulky precipitate, more gelatinous than oxide of zinc, is permanently white, with a slight tinge of salmon-color when seen in bulk, and does not change color when exposed to the air or the direct rays of the sun. The anhydrous oxide, which has a pale fawn-colored tint, is not volatile nor decomposed by heat. The new element differs very essentially from manganese, zinc, and cadmium, but has, perhaps, some points of similarity with lanthanum. —Chem. News, September 16, 1881, p. 138.

Metallic Actinium—Isolation.—In a further note (Ibid., October 14, 1881, p. 191) Dr. Phipson announces the successful isolation of actinium in the metallic state by means of magnesium, which precipitates it rapidly from its ammoniacal solution, with evolution of abundance of hydrogen and considerable production of heat. Zinc does not precipitate it under any of the conditions tried. It was obtained in the form of a light-gray deposit, which, by compression, becomes white like silver and extremely brilliant; it oxidizes slowly in water and saline solutions, but can be preserved under alcohol. Inasmuch as the process of separating the oxide of actinium does not preclude the presence of small quantities of oxide of zinc, the author hesitates to describe the reactions of the new metal and its salts, until further experiments have determined its absolute purity.

ORGANIC CHEMISTRY.

HYDROCARBONS.

(Including Volatile Oils and Resins.)

Shale and Petroleum Products—Characters of Distinction.—At the Swansea meeting of the British Pharmaceutical Conference, Mr. Alfred H. Allen had described some experiments showing that the various commercial products derived from petroleum differed from the parallel series of products obtained by the distillation of bituminous shale.

The differences observed were attributed to the presence in the shale products of a larger proportion of hydrocarbons of the ethylene series, having the general formula C_nH_{2n}, than existed in the parallel products from petroleum. Some doubts having been expressed as to the existence of the supposed difference of composition, Mr. Allen has now made some additional experiments in a new direction, viz., the determination of the quantity of bromine that will combine with parallel products from the two sources named; the readiness with which the olefines, or hydrocarbons of the ethylene series, enter into combination with bromine to form additive products of a stable and definite character, being one of the best-known and most characteristic properties, while the paraffins, or hydrocarbons of the marsh-gas series, do not form additive compounds with bromine, and are practically unaffected by it under ordinary conditions of experiment. The author gives explicitly the method by which the results, given in the appended table, were obtained. They show that there is in each case a striking difference between the proportion of bromine assimilated by any of the shale products, and the quantity which combines with the parallel product from petroleum. The author assumes the absence of hydrocarbons of the acetylene series and other bodies simulating the olefines in their reaction with bromine. The following figures show the proportion of bromine which the author found to react with samples of representative commercial products consisting wholly or chiefly of hydrocarbons, being in nearly all cases the mean of two or more concordant experiments.

SUBSTANCE.	Sp. gr. at 15.5° C.	Grams of bromine combining with 100 grams of sample.	Percentage of bromine of product.
Naphthas:			
1. Gasolene from shale, ...	.665	67.1	41.6
2. Gasolene from petroleum, ...	.652	5.1	4.8
3. Shale naphtha, ...	.718	94.9	48.7
4. Petroleum naphtha, ...	.690	10.0	8.8
5. Benzol, ...	.876	36.2	26.6
Burning oils:			
6. From shale, ...	.801	38.7	27.9
7. From shale, ...	.806	36.4	26.7
8. From petroleum, ...	.800	17.2	14.7
Lubricating oils:			
9. From shale, ...	.889	56.4	36.0
10. From shale (bloomless), ...	.875	45.3	31.2
11. From petroleum (spindle valvoline),	.862	21.6	17.7
12. From petroleum (oleo-naphtha), . .	.905	31.8	24.1
13. Rosin oil, ...	.973	45.3	31.2
14. Refined rosin oil, ...	.978	42.7	29.9
Solid product:			
15. Vaseline, ...		19.7	16.5

—Yearbook of Pharm., 1881, pp. 490–493.

Solidified Petroleum.—The statement that has been frequently made for some time that ordinary petroleum illuminating oil can be converted into a solid substance, which again is readily liquefied on the addition of an acid, has induced Mr. Edwin Johansen to make some experiments which show that such petroleum oil will form with soap an opodeldoc-like gelatinous mass, possessing some of the properties claimed. By heating the petroleum with 1½ per cent. of soda soap a gelatinous mass is formed, and with 3 per cent. it becomes quite firm, notwithstanding that the soap contained 25 per cent. of water in the author's experiment. The mass, when exposed to flame, melts and burns similar to sealing-wax. When squeezed between the fingers, however, it gives off a portion of the petroleum, and when allowed to remain in contact with wood, the latter is soon penetrated by the petroleum. Hence this product cannot be transported in wooden boxes, as is claimed for the original compound. The addition of an acid, of course, rapidly decomposes the soap, and thus sets free the petroleum. The author's inquiries speak against the practicability of supplying the public with solidified petroleum. Even if the solidification is as perfect as is claimed, the subsequent necessity to liberate it before combustion by means of an acid is a great obstacle to its popular use.—Schweiz. Wochenschr. f. Pharm., No. 19, 1882, pp. 167–170; from Pharm. Zeitschr. f. Russl.

Paraffin Wax—Improved Quality.—According to "Oil, Paint, and Drug News," the process of manufacturing paraffin oil has been so far improved that its crude wax is now largely used by candle manufacturers, who formerly employed only the refined wax for this purpose. The 10 to 13 per cent. of oil formerly in the crude paraffin rendered it entirely unfit for this purpose, while, at present, the crude article contains not above 8½ per cent.

Paraffin—Purification.—Instead of depriving paraffin of the liquid hydrocarbons by the aid of hydraulic pressure, E. v. Hächt recommends that the oily bodies be removed by means of superheated steam. The paraffin is introduced into a still provided with a faucet at the bottom, and the liquid hydrocarbons are expelled. The paraffin is drawn off, and, when clarified in the usual way, has a melting-point at 70° C. The oils obtained as by-products are very handsome and homogeneous.—Arch. d. Pharm., February, 1882, p. 124; from Chem. Ztg., No. 50, 1881.

Paraffin Oil—A New Source of Oxalic Acid.—Which see, under "Organic Chemistry."

Naphthalin—Purification.—Mr. G. Lunge has found a method of rendering naphthalin permanently white and pure, which resembles that used for accomplishing the same end in the case of carbolic acid. Hitherto, the secret of turning out perfectly pure naphthalin, which would not become pink or dark-colored by age, was confined to a few large works. Suspecting that the change in color of ordinary commercial naphthalin was caused by the gradual oxidation of higher homologues, he conceived the idea of oxidizing them to the utmost before the final distillation of naphthalin, and, on trial, met with complete success.

Crude naphthalin is mostly obtained from the oils which remain after treating the "middle oil" with caustic soda, for the purpose of extracting the phenol. Such naphthalin may be purified, as stated below, by beginning to treat it with acid at once. Such naphthalin, however, as has been obtained by direct crystallization from the tar-oils, should first be treated with soda to remove phenol. The naphthalin is then melted and intimately mixed with 5 to 10 per cent. of sulphuric acid of 66° B., or a correspondingly larger quantity of 60° B. To the mixture is gradually added finely-ground manganese dioxide, amounting to 5 per cent. of the weight of the naphthalin, and the whole heated on a water-bath (or at the usual temperature of the water-bath) until no further action takes place. The operation lasts from fifteen to twenty minutes. If regenerated oxide of manganese —so-called Weldon mud—is available, this is preferable to the crude oxide. After cooling, the cake is several times melted with water; lastly, with addition of a little soda-lye; and, finally, with pure water. On a large scale, the washing need not be interrupted by cooling off the naphthalin. The resulting cake is then distilled, and most of it passes over as pure naphthalin.—New Rem., December, 1881, p. 363; from Ber. Deutsch. Chem. Ges., 1881, p. 1755.

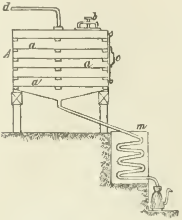
Referring to the above communication, Mr. William W. Stavely remarks that Professor Lunge is, unwittingly, unjust to tar distillers generally when he assumes that the process of the manufacture of pure naphthalin is still considered a secret one, and is not known to many tar distillers. He believes that pure naphthalin will be produced at any of the large tar works as soon as the demand will justify its production. In tar works where the refining of benzols, etc., is carried on, pure naphthalin may be easily obtained, without further chemical treatment, by distilling the residue or foots from the rectifying stills, and allowing the distillate, say from 0.950 to 1.000 sp. gr., to cool for a day or so; the deposited naphthalin is drained and pressed, redistilled or sublimed. Naphthalin thus prepared has kept its color, or, rather, has not become discolored, on exposure to light for some months. The author further draws attention to the importance of subjecting the naphthalin to hydraulic pressure before treatment, which Professor Lunge omits to mention. This is important, inasmuch as samples of naphthalin prepared from light oil residues, etc., by this process, though they would probably remain white for some months, would yet retain sufficient cumol, xylol, etc., to render the naphthalin unfit for naphthol colors.—Chem. News, August 19th, 1881, p. 85.

Naphthol—A New Remedy for Cutaneous Diseases.—Chemists distinguish two isomeric compounds—*a* naphthol and *β* naphthol. The latter, which has been experimented with by Professor Kaposi, is extensively used in dyeing, and is met with in commerce in large lumps, violet-brown; of a crystalline texture; friable; with a slight odor, resembling that of carbolic acid; easily soluble in alcohol, liquid and solid fats; also in diluted alcohol. It colors the skin faintly brown, and produces only slight desquamation. It is rapidly absorbed; the urine is, on the following day, turbid, but contains no albumen. The ointment does not color the clothes or bandages; the alcoholic solution gives them a rose-red color, which is easily removed by hot water and soap. Further observations must decide in which diseases naphthol is best indicated.—Am. Jour. Phar., September, 1881, p. 442; from Phar. Centralh. and Allg. Wien. Med. Ztg.

Wood tar—Constituents.—F. Tiemann and P. Koppe find that the acid wood-tar oils, boiling between 180° and 300°, contain phenol, paracresol, *a*-metaxylenol, guaiacol, creosol, and the dimethylic ethers of pyrogallol, methylpyrogallol, and propylpyrogallol. The constituents may be separated into three different classes, viz., indifferent, creosol, and guaiacol oils, by the following treatment: A solution of oil in double its volume of ether is shaken with 5 per cent. potash solution, the acid oils are taken up by the alkali, and the indifferent oils remain in the ether. The alkaline solution is acidified with sulphuric acid and extracted with ether. After evaporating the ether, the residue is distilled and the distillate mixed with half its volume of ether and twice its volume of a saturated solution of alcoholic potash. The guaiacol and cresol (? Rep.) are deposited as a crystalline compound; the filtrate contains cresol and its homolognes.—Journ. Chem. Soc., January, 1882, p. 50; from Ber. d. d. Chem. Ges., No. 14, pp. 2005–2014.

Apparatus for Distilling Essential Oils (Fig. 60).—The square box, *A*, contains a number of metallic perforated diaphragms, upon which are placed—through the door, *C*, which may be closed hermetically—the plants or materials which are to be distilled. Steam is admitted through the pipe, *d*, and penetrates the material by a downward current, passing on to a cooler, *m*, where it is condensed, and from which the condensed liquid runs into a Florentine flask, where the oil is separated. This apparatus has been devised by M. Melnikoff, in Odessa, and has been found very efficient in practice, according to a report contained in the Journal of the Russian Agricultural Society, 1880, p. 80.—New Rem., November, 1881, p. 331; from Dingler's Polyt. Jour., vol. 233, 239.

Fig. 60.



Melnikoff's Still for Essential Oils.

Ethereal Oils—Solubility in Alcohol as a Test of their Purity.—The behavior of ethereal oils towards alcohol of certain strengths has been made the basis of several methods of testing their purity. Dr. Hager, in the "Pharmaceutische Centralhalle," of January 12th, describes his own process as follows:

Mix 1 volume of ethereal oil at 16° to 18° C. (about 60° to 60.5° F.) with 2 volumes of absolute alcohol (specific gravity 0.799). When the mixture has become clear, add diluted alcohol of the specific gravity 0.889, containing 70.9 per cent. by volume of absolute alcohol, in small portions, or in drops, until the mixture has become, after one minute, so far turbid that it only appears opalescent when agitated, without being milky. In many cases, the further addition of a drop of diluted alcohol is sufficient to render the opalescing mixture milky-white. If the opalescence, at the above-named temperature, is accompanied by flocculent particles, in the case of oil of anise, rose, and similar oils, the adulterant may be spermaceti, paraffin, or other such bodies.

If the mixture is turbid, but still translucent, more of the diluted alcohol is added, until the proper point is reached. It should be barely translucent.

This alcohol test permits the recognition of adulteration in most cases, though not always the precise adulterant. The latter must be sought for by other means.

The following list is given by Dr. Hager, with the statement that the results are based upon tests made with two or three kinds of each oil. He adds that possibly a few of the figures require further confirmation or correction.

Where x is quoted, the oil is completely soluble in the diluted alcohol. If the mixture of the oil with 2 vols. of absolute alcohol is turbid or milky, this is specially stated.

The figures in brackets denote the specific gravity of the oils which were examined.

A mixture of 1 volume of ethereal oil and 2 volumes of absolute alcohol (0.799)	requires to be rendered opalescent, vols. of dil. alcohol, sp. gr. 0.889.
Benzol (sol. in 9 vols. of the dil. alcohol).	
Carbon disulphide (1.272),	0.8 to 0.9
Chloroform (1.495),	10 " x
Nitrobenzol (oil of mirbane, 1.185),	10 " x
Oil of almonds, bitter (0.960),	10 " x
" amber, rect. (0.858),	0.3 " 0.5
" angelica root (0.898),	0.5 " 0.7
" " seed (*milky-white*).	
" anise, Russian (0.981),	1.3 " 1.5
" " very old (0.990),	10 " x
" " star, fresh (0.976),	0.8 " 1.0
" " " (0.979),	1.2 " 1.4
" bergamot (0.875),	1.0 " 1.3
" cade (1.005),	0.05 " 0.15
" cajuput (0.920),	3.0 " 4.0
" " green (0.904),	8.0 " 10.0
" " old,	5.0 " 8.0
" calamus (0.920; 0.940),	0.9 " 1.1
" cardamom (0.980),	1.5 " 2.0
" caraway (0.945),	3.0 " 5.0
" " old (0.955),	8.0 " 10.0
" " rectif. (0.903),	1.8 " 2.0
" cinnamon cassia (1.030),	2.0 " 2.5
" " Ceylon,	15.0 " x
" cloves (1.060),	10.0 " x
(*Sol. in 2 vols. dil. alcohol.*)	
" copaiva (0.920),	0.3 " 0.35
" coriander (0.880),	5.0 " 10.0
" cubeb (0.945), *turbid mixture.*	
" " (0.920),	0.05 " 0.1
" curled mint (mentha crispa) (0.940),	0.8 " 1.1
" dill (0.880),	3.5 " 5.0
" eucalyptus (0.900), *milky-turbid.*	
" fennel (0.990),	0.8 " 1.1
" " very old,	1.3 " 1.5
" juniper berries (0.850), *milky-turbid.*	
" juniper wood (0.860),	0.5 " 0.75
" lavender (0.890),	2.0 " 2.5

Oil of lavender, old (0.888),	10.0 to x
" lemon (0.870),	0.2 " 0.4
" " (quintessential),	4.0 " 4.2
" limetta (0.900),	0.15 " 0.3
" lemongrass (0.888),	6.0 " 10.0
" mace (0.895),	0.6 " 0.9
" marjoram (0.901),	1.5 " 2.5
" melissa (0.878),	3.0 " 3.3
" mustard, ethereal,	10.0 " x
" neroli (0.870),	2.5 " 3.3
" orange, sweet (0.850),	0.3 " 0.5
" orange, bitter (0.876),	0.35 " 0.5
" palmarosa,	1.2 " 1.5
" parsley (0.950),	1.0 " 1.3
" patchouli (0.980),	0.4 " 0.5
" peppermint (0.915),	1.2 " 1.9
" " very old (0.925),	5.0 " 6.5
" rose (0.860),	0.4 " 1.2
" rosemary, French (0.894),	2.5 " 2.8
" " Italian (0.904),	4.0 " 5.0
" rue (0.890),	4.0 " 5.0
" savin (0.898),	0.5 " 0.7
" sage (0.920),	1.5 " 1.8
" santal (0.980),	4.0 " 5.0
" sassafras (1.060),	1.7 " 1.8
" " very old (1.080),	3.5 " 4.0
" tansy (0.920),	2.0 " 2.5
" thyme (0.895),	1.0 " 1.4
" turpentine (0.890), *milky-turbid.*	
" valerian (0.970),	3.5 " 4.5
" verbena (0.895; 9.863), *milky-turbid.*	
" vetiver (0.923),	0.9 " 1.1
" wintergreen (1.158),	7.0 " 10.0
" wormseed levant (0.920),	10.0 " x
" wormwood (absinth.; 0.965),	3.5 " 5.0
" " (chenopod.; 0.960),	8.0 " 10.0
" ylang-ylang (1.009),	0.7 " 0.9

—New Rem., June, 1882, pp. 168–169.

Essential Oils—Detection of Alcohol.—E. Barbier distils off $\frac{1}{10}$th and adds to the distillate an excess of dry acetate of potassium, which forms with the alcohol a heavy solution, and can be separated by means of a separatory funnel from supernatant ethereal oil; it is then mixed with 4 vols. of water, and again saturated with acetate of potassium, by which means a further quantity ef essential oil is separated out.—Chem. News, June 30, 1882, p. 288; from Zeitschr. f. Anal. Chem., xx., No. 4.

Essential Oils—Value of the Rosaniline Test.—Mr. E. B. Stuart's experiments lead him to the conclusion that, while rosaniline will indicate the presence of alcohol (see Proceedings, 1878, p. 435) in much smaller quantities than would be likely to be added for the purpose of adulteration, it fails to distinguish that adulterant from the minute quantity of water which essential oils are likely to contain, incidental to the distillation of the drug that produces them with water, and that the difficulty of separating the dissolved water is so great as to nullify any advantages it might otherwise possess. In the author's experience the following

Test for Alcohol in Essential Oils, has proved most useful: Take a test-tube or Florence flask, or even a vial will answer, fit a cork tightly, through which a glass tube, bent at a right angle at its middle, has been passed. The free end of the tube is placed in another vial or test-tube; the latter is most convenient. The corked test-tube contains the suspected oil, and is placed in a water-bath, which may be extemporized from a tin cup, and a gentle heat applied. At a temperature of about 175° any alcohol present will distil over, and may be condensed in the second test-tube, which is partially immersed in water of as low a temperature as can be conveniently obtained. If any alcohol distils over, it can usually be identified by its sensible properties, taste, smell, etc.; but if not, the liquid should be colored by the addition of a drop or more of compound tincture of iodine. Liquor potassa is then added drop by drop until the color disappears, the solution having been previously warmed to about blood-heat. On standing, a yellow sediment of iodoform will subside if even traces of alcohol were present.—Proceed. Ills. Phar. Assoc., 1881, p. 39–41.

Oil of Turpentine—Formation of a New Antiseptic.—Dr. C. F. Kingzett (London "Lancet") claims that the product obtained by forcing air through oil of turpentine during a period of from one to two hundred hours, has an antiseptic quality superior to any hitherto known. The oil of turpentine so treated loses its volatile character, and, although not soluble in water, it forms in contact with this, or any moist surface, strongly antiseptic principles.—Am. Jour. Phar., November, 1881, p. 380, from Chic. Med. Rev., September, 1881.

Oil of Cajeput—Value in Infantile Eczema.—Dr. Claiborne claims to have secured very good results from the use of the oil of cajeput in infantile eczema. The drug was used in the form of a lotion composed of oleum cajeputi, four drachms; sapo viridis, four drachms; and alcohol, two ounces; with which the eczematous patches were washed at least once a day. An ointment composed of two ounces of oxide of zinc ointment and two drachms of oil of cajeput was kept locally applied to the eczematous patches. The oil of cajeput has often been used in other dermatoses, though without much effect, but this is perhaps the first contribution to its use in any form of eczema.—Am. Jour. Phar., September, 1881, 475; from Chic. Med. Rev.

Volatile Oil of Ginger—Examination.—Mr. John C. Thresh has communicated the results of an investigation of the volatile oil of ginger. The oil for this purpose was distilled for him by Messrs. Wright, Layman and Umney, who obtained only 1.4 per cent., while it is stated in "Pharmacographia" (2d ed., p. 577), that Messrs. Schimmel & Co., of Leipsic, obtained as much as 2.2 per cent. The crude oil of ginger has a pale straw color, and somewhat camphoraceous odor. It is not so fragrant as the "foreign" oil, but when diluted largely with diluted alcohol, the sweet fragrant odor of Jamaica ginger is most prominent; taste aromatic, not pungent, consistence approaching that of oil of almonds. Sparingly soluble in rectified spirit, but soluble in all proportions in ether, chloroform, benzol, bisulphide of carbon, and glacial acetic acid. The fresh oil forms with glacial acetic acid and rectified spirit clear solution; but oil which has been kept for some time, when shaken with excess of either of these solvents, forms an opalescent mixture. Oil which has been exposed to the air distinctly reddens moistened blue litmus. The sp. gr. of the "English" oil is 0.883 at 63° F.; "foreign," 0.9004 at 66° F.; according to "Pharmacographia," 0.878; "Gmelin," 0.893. The results of the chemical investigation of the oil shows it to be an exceedingly complex mixture of hydrocarbons, and of their oxidation products. The more volatile portion contains the odorous principle (most probably an oxygenated compound), and is most susceptible of oxidation. The soft, resinous, fragrant matter which gradually forms on the lid of a jar containing ground ginger is doubtless produced by the oxidation of the oil, which slowly volatilizes at ordinary temperatures and condenses on the lid. Both the "English" and the "foreign" oil consist chiefly of a hydrocarbon, probably with the formula $C_{15}H_{24}$, but that of the former boils at a higher temperature, and differs remarkably from the latter in its action on polarized light. Their compounds with hydrochloric acid appear to correspond. Cymene is a constituent of the distilled oils, and most probably also of the crude oil. The latter contains a little formic and acetic acids.—Yearbook of Pharm., 1881, p. 393–401.

Volatile Oil of Mastic—Yield and Characters.—Professor F. A. Flückiger, accepting the view that is generally held, has stated in his "Pharmacognosie" (2d ed., 1881, p. 106), that mastic contains extremely small quantities of volatile oil. He has now occasion to correct this statement, having received information from Messrs. Schimmel & Co., of Leipsic, that they have obtained the oil to the amount of 2 per cent. of the crude substance. Samples of the mastic and of the oil were placed at his disposition. Experiments made with this volatile oil by Mr. A. Mayer and by Mr. Jungclaussen have proven that it is, like the volatile oil of Chios turpentine, a terpene of the composition $C_{10}H_{16}$. Its odor is strong and very pleasant. It boils at 155° and distils at

160°. It is right-rotatory.—Arch. d. Pharm., September, 1881, p. 170–171.

Oil of Coriander—Characters and Composition.—Mr. Brunnow Grosser has recently examined oil of coriander, and corrects the statements to be found in textbooks that it is a mixture of a volatile oxygenated oil and a less volatile oil containing but little oxygen. According to Mr. Grosser coriander oil has a composition represented by the formula $C_{10}H_{18}O$, and is therefore isomeric with borneol and the monohydrate of oil of turpentine. Heated with anhydrous phosphoric acid, or by itself in a sealed tube, oil of coriander gives up water, and, according to the conditions employed, either two molecules of oil lose one molecule of water, whereby the compound $C_{20}H_{34}O$ is formed, or one molecule of oil gives up just one molecule of water, and forms a terpene, $C_{10}H_{16}$. Treated with iodine, wherein great caution is required, on account of the explosive nature of the mixture, coriander oil yields cymol. It yields a solid compound with sodium, and yields compound ethers. When very gently oxidized it yields a ketone, or further oxidation gives rise to the formation of various other bodies, one of which is isomeric with adipic acid. A complete or ultimate oxidation splits it up into carbonic, acetic, and oxalic acids.—Ber. d. d. Chem. Ges.. 14, 2465–2508.

Oil of Satureja montana, Lin.—Characters, etc.—This plant, grown on the mountains in the neighborhood of Grasse, was subjected to distillation, 150 kilos yielding about 125 grams of volatile oil. This was examined by A. Haller, who found it to be of a yellowish orange-color and of an odor resembling that of origanum. It is a thin liquid, has the density 0.7394 at 17° C., deviates polarized light to the left, and consists of two hydrocarbons, with 35 to 40 per cent. of carvacrol and a small quantity of an oxygenated body, boiling below 235° C. One of the hydrocarbons distils between 172° and 175°, the other between 180° and 185° C.—Am. Jour. Phar., June, 1882, p. 302; from Jour. Pharm. et Chim.. March, 1882, pp. 357 to 360.

Oil of Sandal-wood—Yield and Characters.—Mr. P. Chapoteaut finds that the wood of *Santalum album*, of Bombay, yields from 1¼ to 2¾ per cent. of the essential oil when distilled with water. It is composed of two different bodies, the one, constituting the much larger portion, boiling at 572° F., and having the formula $C_{15}H_{24}O$, while the second boils at 600° F., and has the formula $C_{15}H_{26}O$. Phosphoric acid transforms them respectively into two hydrocarbons, $C_{15}H_{22}$, boiling at 472° F., and $C_{15}H_{24}$, boiling at 500° F. The hydrocarbon $C_{15}H_{24}$ is isomeric, or perhaps identical with that of copaiba, while the first hydrocarbon boils at the same temperature and is identical with the liquid essential oil of cedar. By slow distillation two other oils may be obtained from the primary oil, one boiling at 472° F., and the other at 652° F.. their respective formulas being $C_{20}H_{30}O$ and $C_{40}H_{60}O_2$.—Chem. Jour., June 23d, 1882, p. 388; from Rép. de Pharm., June, 1882.

Tobacco-bush Oil—Source and Uses.—See *Hedyosmum nutans*, under "Materia Medica."

Volatile Oil of Linaloes (Licari Kanali, the White Cedar of Cayenne.—According to H. Morin this volatile oil is a pale-colored limpid liquid, of an agreeable odor resembling rose and lemon, and burning with a sooty flame. Distilled over calcium chloride, he found it to have the density 0 868, and to boil at 198° C. It is levogyre, soluble in alcohol, ether, and glycerin, reacts violently with bromine, iodine, and nitric acid, and forms with hydrochloric acid gas a thick liquid, having a camphor-like odor. Its composition is $C_{10}H_{18}O$, and when treated with fused zinc chloride it yields a hydrocarbon, $C_{10}H_{16}$, having a turpentine-like odor.—Am. Jour. Phar., November, 1881, p. 573; from Compt. Rend., xcii., p 998.

Volatile Oil from New Zealand Kauri Gum—Characters and Composition.—In 1843. R. D. Thomson, and again in 1874, M. M. P. Muir had examined the volatile oil of New Zealand Kauri gum, the latter arriving provisionally at the composition $C_{10}H_{20}O_7$, though the quantity at his disposal was too small to make certain of the purity of his product. Having a considerable quantity of the Kauri gum at his disposal, Mr. Edward H. Rennie has now re-examined the oil, and has obtained results from which it appears that the oil obtained in its distillation consists almost entirely of a terpene, corresponding in composition to the formula $C_{10}H_{16}$, boiling at 157° to 158°, and closely resembling the other members of the same family in its physical and chemical characteristics. Its sp. gr. (at 18°) was 0.863; it was perfectly colorless, and had the strong odor of turpentine. The small remaining portions of the oil, which have higher boiling-points, are apparently formed by polymerization. 15 pounds of the resin yielded about 750 c.c. of the crude oil.—Am. Jour. Phar., August, 1881, pp. 418–419; from Jour. Chem. Soc.

Oil of Peppermint—Production in Wayne County, N. Y.—The editor of "New Remedies" (April, 1882, pp. 98–100), gives an interesting account of the cultivation of peppermint and the distillation of the oil from it in Wayne County, N. Y. In this county alone, more than 3000 acres of mint are cultivated annually, with an average yield of about 20 pounds of oil to the acre, or a total yearly production of over 60,000 pounds. Peppermint should be grown on a warm, rich soil, which is not too dry, since it produces plants which are too small. On the other hand, the plants grown on a wet soil fail to produce oil in paying quantities. Gravel or clay are, therefore, unsuitable soils. The land should be well ploughed as late in the fall as possible, and either cross-ploughed or thorougly pulverized in some other manner. Early in the spring the land should be laid off in furrows twenty-four to thirty-six inches apart, and "sets" or portions of the roots of old plants are to be thickly placed in the furrows, and covered lightly. The plants must be kept free from weeds until they cover the surface of the soil, which they will do completely by the second year. Many of the cultivators of peppermint on the rich bottom lands of the Ganargua Creek of Wayne County are German, and men, women, and children may often be seen in the fields in the season engaged in cultivating the crop. The harvest commences early in August or as soon as the plant is in flower (by which time it will have attained a height of about two feet or upwards), and continues into September; warm or hot weather being essential at harvest-time that the plant may produce oil abundantly. The first crop is the best; the crop of the second year less desirable, and on the third year the ground may be again ploughed, and the crop allowed to spring up from the broken roots. The yield in the third year, when the ground is treated in this manner, is somewhat less than that of the first year. After this, the land should be devoted for a time to some other crop. Not only is the yield most abundant the first year, but the crop is more free from weeds than during the subsequent years, and the oil is correspondingly purer. The weed which causes most trouble is the *Erechthites hieracifolia*, Raf.,* otherwise known as "broom-weed," "mare's-tail," "fire-weed," etc., a composite (like lettuce), yielding a volatile oil which is bitter and pungent, and by its presence impairs the naturally fresh, penetrating, and delicious taste of the pure oil of peppermint.

The mint is cut with a sickle, scythe, two-fingered cradle, or mowing machine, according to the option or carefulness of the cultivator. It is then allowed to wilt in the sun for five or six hours, and then is raked into "cocks," where it is allowed to remain a short time before being distilled. This process is found to give a larger yield of oil and to improve the color of the product. Not every cultivator is provided with a still; but such appliances are found distributed about the region at accessible distances. Some are of the most primitive character, while others are constructed more elaborately. The apparatus and method differ from that employed in Europe, where the fire is applied to the still. In this country, the still consists of a wooden tub or vat of heavy staves, hooped with iron, and of a size to correspond with the amount of steam furnished by a boiler. The vats seen by the writer were four to five feet in diameter and twice as deep. The wilted mint is packed into the vat by treading with the feet until the vat is full, when a cover, made steam-tight with rubber-packing, is fastened down with screw-clamps. A steam-pipe connects the lower part of the vat with a steam boiler, and another pipe from the centre of the cover connects the vat with the condensing worm. The latter varies in size according to the capacity of the still, but becomes progressively smaller towards the outlet. The worm is so placed as to have a constant stream of cold running water surrounding it. The steam from the boiler being admitted to the vat at a pressure of 30 to 40 pounds, the oil of the mint is volatilized and mixed with the steam, it is condensed in the worm. The mixed oil and water are collected in the receiver, where the difference in their specific gravity causes them to separate. In many instances, the receiver is a tin vessel, with a small pipe opening from its lower part and ascending nearly to the top, where it turns outward. The weight of the oil causes the water in the lower part to ascend in the discharge-tube until it overflows from the pipe. In the meantime, the oil is dipped from the vessel whenever a few pounds have accumulated. No attempt is made to redistil the water which separates, and a considerable loss of oil, which is held in solution, doubtless results from this lack of economy. The oil is packed in tin cans or glass demijohns, holding about 20 pounds each. The paper is accompanied by two cuts, one being a view of a building used for distilling oil of peppermint, the other a diagram of the apparatus used for distilling the oil.

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* Erigeron canadense?—SECRETARY.

Oil of Peppermint—Reaction.—Flückiger observed (1871) that oil of peppermint acquires a blue-green color with nitric acid, specific gravity 1.2. In 1878, A. Schack observed that an alcoholic solution of the oil will gradually acquire a copper-green color in the presence of salicylic acid. On adding the oil to melted salicylic acid a blue-green mass is at once produced, soluble in alcohol. All acids experimented with, including carbolic acid, but not carbonic acid under ordinary pressure, give a similar reaction, particularly in the presence of alcohol, application of a moderate heat being necessary in some cases. A mixture of 1 c.c. glacial acetic acid and one drop of oil of peppermint, slightly warmed, shows the color very beautifully, it being blue in transmitted and blood-red in reflected light, and after diluting with alcohol until the blue tint has nearly disappeared, the red reflection is still observed in the sunlight on pouring the liquid out in a thin stream, and looking vertically into it. Menthol and oil of crisped mint do not show the reaction.—Am. Jour. Phar., February, 1882. p. 77; Archiv d. Phar., December, 1881, pp. 428–430.

Menthol—Characters, etc.—R. W. Atkinson and H. Yoshida have given menthol a careful examination. After repeated purification by distillation, careful pressing between filter-paper, etc., the authors obtained menthol, melting at 42.2° C., solidifying at 40.3° C., and boiling at 212° C. Mr. Moriga has shown that menthol, when heated with acid bichromate solution at 120° C., yields an oil boiling at 404° C., having the composition of menthone, $C_{10}H_{18}O$ ("Jour. Chem. Soc.," March, 1881). The authors have repeated these experiments, using larger quantities. Menthone is a colorless mobile liquid, neutral to test-paper, soluble in alcohol, chloroform, benzene, and bisulphide of carbon; insoluble in water. If a solution of menthone in petroleum naphtha be heated with sodium, the solution formed decomposed by carbonic acid, the product shaken with water, rapidly separated from the oily layer, and set aside, minute crystals of menthol are obtained. Menthol, therefore, stands to menthone in a similar relation to that which borneol stands to camphor. The menthol thus prepared from menthone melts at 42.2° C., but has a rotatory power of — 39. The authors then prepared menthene, $C_{10}H_{18}$, by heating menthol with zinc chloride; the crude product was purified by careful fractionation and long digestion with sodium. The pure product distilled over constantly at 167.4° C. Menthene is a colorless liquid, moderately soluble in ether and alcohol, more soluble in benzene turpentine, and petroleum. By treating menthol with hydriodic acid, distillation, treatment with caustic soda, sodium, etc., a colorless hydrocarbon was obtained, which consisted chiefly of $C_{10}H_{16}$, with a small quantity of $C_{10}H_{18}$ or $C_{10}H_{20}$.—Am. Jour. Pharm., February, 1882, p. 70; from Chem. News, December 9th, 1881, p. 283.

Oil of Erigeron Canadense—Occurrence and Detection in American Oil of Peppermint.—American oil of peppermint is frequently colored and of inferior quality, which is due to the growth of Canada erigeron in the American peppermint plantations. With the view of detecting the presence of oil of erigeron in oil of peppermint, Ferd. Vigier and Charles Cloëz have prepared the former from plants grown near Paris, and obtained from the fresh herb 0.7 per cent., and from the root and crown 0.4 per cent. of oil. Fresh peppermint yields only between 0.05 and 0.15 per cent. of oil.

Oil of erigeron is of a yellow color, of a weedy odor and of an acrid burning taste, and in contact with the air oxidizes rapidly, producing a red-brown deposit, resembling in odor that of oxidized oil of orange (Portugal). Most of the oil distils between 175° and 177° C. Rectified at 177° the oil is colorless, very mobile, of a peculiar strong odor, does not stain paper permanently, is not inflammable directly, but thrown upon burning charcoal burns with a sooty flame. It is insoluble in 85 per cent. alcohol, has at 10° C. a density of .848, a rotating power of + 16.15° and the elementary composition of oil of turpentine, $(C_5H_4)_n$. Dry hydrochloric acid gas yields with it a crystalline compound containing 52.51 per cent. HCl. No liquid compound is formed.

Nitric acid reacts violently with oil of erigeron, the elevation of temperature being slight, producing a yellowish viscous resin, which is soluble in potassa, with a dark-red color and with the formation of potassium oxalate. Sulphuric acid colors the oil black, but the mixture does not completely solidify. The oil does not explode with iodine, and is not colored by chloral hydrate until a drop of hydrochloric acid is added, when it becomes green, and on heating, green-brown.

Concentrated potassa solution does not saponify the oil, but in the cold colors it orange-red, and on heating produces a red-purple viscous mass. Recently-distilled oil is scarcely colored by potassa until it has become oxidized by exposure. Oil of peppermint, fresh or oxidized, does not give this reaction; in the cold a white emulsion is obtained, and on heating, a slightly yellow mixture.

Oil of peppermint must be considered adulterated if with potassa solution it acquires an orange-red color, yields a turbid mixture with an equal bulk of 85 per cent. alcohol at 15° C., and if it turns polarized light feebly to the left; the rotating power of pure oil of peppermint was found to be between —24.5° and —32.3°.—Am. Jour. Phar., January, 1882, p. 12; from Rép. de Pharm., 1881, pp. 415–420 and 466–469.

Angelica Oil—Characters, etc.—The volatile oil obtained from the fruit of *Angelica Archangelica* by distillation with water has, according to Naudain, the specific gravity 0.872 and an agreeable odor. By exposure to the light it soon becomes colored yellow, and by exposure to the air, through absorption of oxygen, becomes resinified. Under ordinary pressure it has no constant boiling-point; it begins to boil at 174° C., although portions pass over even at 330° C. By distillation *in vacuo* 75 per cent. of distillate is obtained, which under a pressure of 22 millimeters, boils at precisely 87° C. This liquid has the formula $C_{10}H_{16}$, and is thus isomeric with turpentine oil, but is different, however, from all similarly composed hydrocarbons; it is colorless, has an odor reminding of hops, and an injurious effect upon the organs of respiration, which is similar to that produced by fusel oil. Its boiling-point is 175° C., the specific gravity 0.833, and coefficient of rotation + 25° 16′; the latter decreases constantly when the oil has been heated to 100° C., in a sealed glass tube, until it reaches a minimum of + 9° 44′. The liquid thereby becomes thick, and polymerized to a hydrocarbon, resembling the β-isoterebenthenes, which is already contained in the crude angelica oil, and for which the author proposes the name of terebangelene. By the action of the halogens a violent reaction ensues, with the formation of cymol.—Am. Jour. Phar., April, 1882, p. 159; through Chem. Ztg., No. 4, p. 68; from Compt. Rend., 93, p. 1146.

Oil of Ranunculus, Anemonin, and Cardol—Comparative Poisonous Action and Relations to Cantharidin.—Mr. Alfred Basiner has undertaken a series of experiments with the above-named substances with a view to determining their poisonous action, and particularly to ascertain the points whereby they may be distinguished from cantharidin. Comparing the results obtained with the three substances named, the following may be deduced:

1. The three bodies may be isolated by extraction with glacial acetic acid and agitating with benzol.

2. Although cantharidin may be isolated in the same manner it cannot be confounded with the former three bodies, since it may likewise be obtained by means of caustic potassa, which decomposes the other three bodies.

3. Oil of ranunculus and cardol are powerful and sure vesicants, while the vesicating action of anemonin is uncertain.

4. Anemonin taken internally acts as a narcotic, the other two as acrid narcotics; the narcotic action is directed upon brain and spine. The corrosive action of oil of ranunculus takes place in the stomach, but that of cardol in the lower part of the small and in the large intestines.—Am. Jour. Phar., March, 1882, pp. 130–133.

Cardol—Irritating Effects.—Mrs. Ida R. Brigham describes the irritating effects of cardol, which exists to the amount of 10 per cent. in the oleaginous liquid contained in the pericarp of the cashew nut (*Anacardium occidentale*), the remaining 90 per cent. being chiefly anacardic acid. During experiments, made for the purpose of isolating the vesicating principle, a very small particle of the juice of the nut was spattered on the cheek, and, notwithstanding that it was immediately washed off with water and then with ether, painful inflammation set in, which yielded only slowly to treatment. A slight burning was felt when the juice first came in contact with the skin; a red line soon appeared, and disappeared the next day. On the third day, however, this red line again appeared, and the inflammation gradually extended over the entire cheek, and finally over the whole face and ears. Various remedies were applied—ammonia water, borax water, Goulard's solution, iodized glycerin, lime liniment, rose-water ointment, and zinc ointment—and among them the last-named seemed to give the greatest relief from the painful itching; but none of them seemed to arrest the course of the disease, which culminated on the eleventh day. This experience proves the excessively irritating character of cardol, and would seem to speak against its use for any medicinal purposes whatever, notwithstanding that several authors speak of its use for the removal of corns, warts, and callosities, and some as a vesicant instead of cantharides.—New Rem., February, 1882, p. 38.

Oil of Wild Thyme—Examination.—This oil, which does not appear to have been examined before, has now been examined by P. Feboe.

A preliminary distillation separated the liquid into two products, one colorless, boiling at 170°–200°, the other, strongly colored, boiling between 200°–250°. The first liquid was fractioned over sodium, and obtained of tolerably constant boiling-point, 175°–177°. It is a colorless liquid, with an odor of lemons, having a density of 0.873 at 0°, and a very feeble rotatory power. The density of its vapor, determined at 192.5° under 748 mm. pressure, was 4.78. The theoretical density of the hydrocarbon, $C_{10}H_{14}$, is 4.63, with which formula the percentage composition also agreed. Ordinary sulphuric acid has no action upon it, but the Nordhausen acid dissolved it without elevation of temperature, and without disengagement of sulphurous anhydride. The resulting liquid was red, and entirely soluble in water. There can be no doubt that this fraction is a *cymene*, $C_{10}H_{14}$, containing probably some traces of a camphene, to which perhaps its feeble rotatory power is due.

The higher portion consisted chiefly of an oxidized body, which when suitably treated and examined proved to be *thymol*.—Jour. Chem. Soc., May, 1882, p. 524; from Compt. Rend., 92, 1290–1291.

Thymol—Synthesis from Cuminol.—Mr. Oscar Widmann has prepared thymol synthetically from cuminol. This, treated with concentrated sulphuric acid and fuming nitric acid, yields nitrocuminol. Nitrocuminol is converted by phosphorus pentachloride into nitrocymylene chloride. The latter, in alcoholic solution, is reduced by the action of zinc and strong hydrochloric acid into cymidine. Finally, cymidine sulphate is dissolved in a considerable quantity of water, the solution made very cold by surrounding the vessel containing it with ice, and potassium nitrate is added in the proportion of a little less than one molecule. Dilute sulphuric acid is added at intervals, constantly stirring, so as to avoid violent evolution of nitrous acid. When this operation is complete the solution is distilled in a current of steam. The distillate is mixed with caustic soda, whereby the thymol formed is dissolved, the solution is shaken with animal charcoal, filtered, and treated with hydrochloric acid, which precipitates the thymol in the form of a finely suspended oil. Upon the addition of a single crystal of thymol to this emulsion, the drops of oil immediately congeal, forming beautiful rhombic crystals of thymol.—Chem. and Drug., April, 1882, p. 165; from Ber. d. d. Chem. Ges., February 13th, 1882.

Thymol—Reactions.—Hammarsten and Robbert give as the most delicate reaction of thymol its behavior to glacial acetic acid and sulphuric acid. The liquid is mixed with half its volume of glacial acetic acid, and then with not less than an equal volume of sulphuric acid. On warming the mixture a beautiful reddish-violet color is produced, which is very permanent and not destroyed by an excess of acid or by boiling. It is plainly observed in dilutions of 1 : 1,000,000; presence of compounds, which by the acid are colored yellow or brown, should be avoided.

Thymol is readily dissolved from its solution in 100,000 of water, by agitation with ether, particularly after the addition of a few drops of hydrochloric acid. But normal urine contains a substance which yields a product of similar reaction on the treatment indicated. On distilling the urine without the addition of acid, the above color reaction is not obtained after 0.1 to 0.2 gram thymol had been taken internally. However, one-millionth of thymol, added to the urine, may be easily detected.

Compared with the ordinary phenol reactions, the following differences are observed :

1. Ferric chloride : phenol, bluish-violet color ; thymol, no action.
2. Sodium hypochlorite and aniline : blue color with phenol and thymol.
3. Sodium hypochlorite and ammonia : phenol, blue color ; thymol, green color changing to blue-green and, after four days, to red.
4. Millon's reagent : phenol, red color, permanent on boiling ; thymol, reddish-violet color, disappears on boiling.
5. Bromine water : phenol, crystalline precipitate ; thymol, turbidity.

Phenol may be detected in mixtures with thymol by ferric chloride and by bromine water.—Am. Jour. Phar., November, 1881, p. 573; from Phar. Ztg., August 31 ; Upsala Läkarefö , xvi., p. 630.

Thymol—Behavior to Reagents and Distinction from Carbolic Acid.—Mr. Edward Hirschsohn, in view of the fact that the literature on the subject of thymol fails to give information whereby its presence may be determined in aqueous solutions, has made a series of experiments whereby this, as well as its distinction from carbolic acid, may be accomplished. Using aqueous solutions of commercial thymol and of carbolic acid of the same strength (1 : 1000), he observed the reactions produced by the reagents given below, in progressive dilutions, to the extreme limit of reaction :

1. *Millon's Reagent.*—Thymol gives with this only a pale coloration, which, in the dilution 1 : 16,000, is very weak, whilst carbolic acid gives a more or less intense red, which, according to Almén, can be recognized in the dilution 1 : 2,000.000.

2. *Hypochlorite of Lime and Ammonia.*—To 5 c.c. of the solution 4 drops of ammonia were added, and then 1 drop of a chloride of lime solution (1 : 3), and the whole warmed. Thymol, with chloride of lime and ammonia, shows no color, but gives a precipitate with chloride of lime. Carbolic acid produces a greenish color—not observable, however, in a greater dilution than 1 : 4000.

3. *Chlorinated Soda.*—Five drops of the reagent (1 part chloride of lime, 20 parts of water, 1 part carbonate of soda) were added to 5 c.c. of the solution. A turbidity results both with thymol and with carbolic acid, but, in the case of carbolic acid, the turbidity disappears on shaking, and the mixture becomes more or less yellow, whilst with thymol no change occurs. An excess of reagent must, however, be avoided, as in this case carbolic acid causes a precipitate which, with a greater addition of chlorinated soda, is dissolved, but, at the same time, the thymol precipitate also dissolves.

4. *Chlorine water.*—This was employed in the same proportions as the chlorinated soda solutions, and gave practically identical results. It seems, however, to be more delicate, and readily enables the detection of thymol in admixture with carbolic acid, a distinct reaction being obtained in a mixture containing $\frac{1}{1000}$ carbolic acid and $\frac{1}{10000}$ thymol.

5. *Bromine-water.*—This reagent shows towards thymol the same behavior as towards carbolic acid, but the sensitiveness is greater, as in a solution of 1 : 60,000 a turbidity occurs, whilst with carbolic acid, according to Almén, such a result was not obtained until after twenty-four hours.

6. *Chloride of Gold* reduces thymol immediately, and this reaction can be used as a means of recognizing thymol in the presence of carbolic acid, as the latter only reduces chloride of gold after a long time.

7. *Chloride of Platinum* seems to be even better for the recognition of thymol than the other reagents named, since only faint opalescence is visible in a solution of carbolic acid 1 : 1000, whilst in all other dilutions it remained clear after boiling and long standing. In the case of thymol, opalescence is observed in a dilution 1 : 64,000, and it is possible to recognize it in the presence of carbolic acid in dilutions containing 1 thymol to 20,000.

8. *Nitric Acid.*—The addition of 5 drops of nitric acid to 5 c.c. of a solution of thymol and boiling causes, according to the degree of dilution, a golden-yellow opacity to a very pale yellow opacity, the latter being in the dilution 1 : 32,000. In the case of carbolic acid the color is also more or less yellow, but all the dilutions become clear on boiling, and show turbidity on cooling only in the dilution of 1 : 1000.—Phar. Jour. Trans., July 9th, 1881, pp. 21, 22.

Thymate of Sodium—Characters.—This compound was prepared by Tanret, but found to be decomposed on dissolving it in water, while it dissolves in an excess (½ equivalent) of soda without decomposition. Byasson regards the compounds of thymol or thymic acid with alkalies as not being true salts. C. Paul regrets that thymol, on account of its disagreeable taste, cannot be given internally, for which reason its combination with soda suggests itself; its action is similar to that of salicylic acid.—Am. Jour. Phar., January, 1882, p. 15; from Bull. et Mém. Soc. de Thérap., 1881, p. 152.

Camphor—Refining.—Until within the past few years the refining of camphor was conducted in quite as primitive a manner as the preparation of the crude product. The operation is well known, and needs therefore no nearer description. Lately, however, Mr. William Simes, of Philadelphia, has devised a process, which differs in many essential features from the older methods, which it is destined to supplant. With all the methods thus far described, the complete desiccation of the crude substance is the important preliminary step. In the process of Mr. Simes the object is to obtain the sublimate in the form of a finely pulverulent snowy mass, for which purpose about one-tenth per cent. of water is generally added to the crude material before sublimation. The apparatus of Mr. Simes consisted of a flat iron chamber, capable of holding about two hundred pounds, which was connected by means of an iron tube with a condensing-chamber eight feet long, four feet wide, and four feet high, constructed of heavy plate glass, in which the sublimed camphor was collected. After an operation was finished, the apparatus was allowed to remain undisturbed over night, to become sufficiently cool, and the next day the sublimed camphor was removed and subjected in moulds to a pressure of 2500 pounds per square inch in a hydraulic press, and the finished product obtained in small cakes highly compressed, and weighing one ounce.

The apparatus now used for volatilizing the crude material is a cylindrical steam boiler, twenty feet long and four feet in diameter, which is provided with the necessary openings for the escape of the volatilized camphor, and which is so set that it is not touched at any point by the direct fire. The condensing-chamber was at first lined with sheet lead, in the same manner as those used in the lead chamber employed in the manufacture of sulphuric acid; but these proved a failure, and the condensing-chamber is now constructed of enameled bricks set in Portland cement. It is thirty feet long, sixteen feet wide, and eleven feet high. The operation is now conducted as follows: The distilling chamber is charged with about two tons of crude camphor, all openings are carefully closed, and distillation carefully effected. The operation requires generally about fifteen hours, and usually three operations are conducted in rapid succession. The apparatus is then left undisturbed for twenty-four hours, to cool off, before the condensing-chamber is opened. The snow-like masses of camphor, often twenty to twenty-four inches deep, are then removed, and either packed in barrels for sale as they are, or pressed into cakes (which are afterwards sawed into smaller blocks), twelve inches square and about three-quarters of an inch thick, in the hydraulic press, under a pressure of 2500 pounds to the square inch.—New Rem., June, 1882, pp. 167–168; from the "Manufacturer and Builder."

Camphor—Compound with Aldehyde.—P. Cazeneuve observes that, when camphor is agitated with an aqueous solution of aldehyde, it unites with the latter, forming a liquid which floats on the water. This compound, like that formed by camphor and hydrocyanic acid, dissociates at ordinary temperatures, leaving a residue of camphor. Its composition is not definite, but varies with the relative proportions of the two substances and with the temperature and pressure. Unlike the compound with hydrocyanic acid, it is decomposed by pure water, but, if the water contains a certain amount of aldehyde, decomposition does not take place. This relation between the *affinity of solution* and *affinity of combination* has already been observed in the case of the molecular combination of camphor with chloral hydrate. An aqueous solution of acetone forms no similar compound with camphor.—Journ. Chem. Soc., May, 1882, p. 526, from Bull. Soc. Chim. (2), 36, pp. 650–652.

Bromated Camphor—Toxic Action.—Professor M. Rosenthal draws attention to the toxic action of this compound. In one case 1 gram had been taken, in the other 3 grams. Both cases were attended by oppression and pain in the head, difficulty of respiration, decrease of the pulse, and in the latter case also with convulsions and final insensibility. Both cases yielded to treatment, but in the last-mentioned case the effects were perceptible for several days.—Pharm. Ztg., No. 94, 1881, p. 703, from W. Med. Blatter, 1881, No. 44.

Salicylated Camphor.—According to "Chem. and Drug" (June, 1882, p. 249), this new combination is prepared by mixing 84 parts of camphor over a water-bath with 68 parts of salicylic acid. When the temperature reaches 90° C., the camphor fuses and the acid is dissolved, forming a limpid liquid having the appearance and density of glycerin. On lowering the temperature the mixture becomes a solid crystalline mass. It is soluble in glycerin, alcohol, and many fixed oils, and is highly recommended as an application for lupus.

Volatile Oil of Mustard—Adulteration with Bisulphide of Carbon.—E. Johanson has examined six samples of the oil by carefully distilling a portion at a temperature not exceeding 80° C., and mixing the distillate with sulphuric acid, when the carbon bisulphide rose to the surface; the quantities obtained were 1.5, 2.0, 0.76, 14.1, 1.85 and 1.4 per cent. by weight. The specific gravity of this liquid, 1.2534, corresponded with that of carbon bisulphide; boiled with alcohol and ammonia, a liquid was obtained giving with ferric chloride the reaction of sulphocyanide; treated with alcoholic potassa, then acidulated with acetic acid and tested with copper sulphate, yellow precipitates of copper xanthogenate were obtained. The residue left in the retort after fractional distillation had the density 1.0195, agreeing with that of pure oil of mustard. This volatile oil naturally contains carbon sulphide, which, however, according to Professor A. Hofmann, does not exceed 0.56 per cent.—Am. Jour. Phar., November, 1881, p. 572; from Phar. Zeitschr. f. Russl., July 26th, p. 517–527.

Oleum Betulæ Lentæ—Manufacture, and Substitution for Oil of Wintergreen.—Mr. George W. Kennedy has witnessed the manufacture of oil of sweet birch bark, as conducted on a considerable scale in the neighborhood of Middleport, Pa. The entire tree is used for the distillation, small trees being preferred. They are submitted to a chopping machine, containing two large knives, about 18 inches long, and 3 to 4 inches wide, made strong and heavy, and which are so arranged that they are operated by a wheel; for every revolution the knives cut four times, and it requires but a short time to cut a ton of the material into pieces from 1 to 4 inches long, in which condition they are ready for the stills. These consist simply of heavy wooden boxes, with copper bottoms, resting on a stone foundation, built about 15 to 18 inches above the surface of the earth, a place being made for fire. Wood is used altogether for fuel. The dimensions of the box or still are 4 x 6 feet, and 3 feet high. The material is placed in the still to its full capacity, and a sufficient quantity of water is added to fill the still about one-third full. In this condition it is generally permitted to remain over night; a fire is made in the morning, and distillation proceeds nicely, condensation being effected either by the ordinary copper worm or by a U-shaped copper pipe (2 inches in diameter), the wings of which are 12½ feet long, and placed in a trough; and the latter arrangement is the preferable. The process of rectification is simple and rapid, but, by request, is for the present withheld. Sometimes teaberry leaves are used with the birch-wood, and occasionally this distiller uses teaberry leaves only. The yield of birch-wood is about 5 pounds of oil per ton of 2240 pounds (or 0.23 per cent.), and it is well understood that the above-mentioned process of maceration, previous to distillation, is absolutely necessary to the development of the oil. From the same quantity of teaberry leaves, 18 pounds of oil are obtainable, but these are much more expensive. No oil of birch is distilled during the month of October, about the time when the leaves fall, on account of the small yield.

Mr. Kennedy finds the oil of birch to be colorless, of a strong and agreeably aromatic odor, and of a sweetish aromatic taste. Its sp gr. is 1.178, and it boils at from 424° to 436° F., rising to 442° F., where it remains stationary. In its chemical relations it appears to correspond with oil of wintergreen, for which the product of this manufacturer appears also to be sold indiscriminately, whether made from birch alone or from birch and wintergreen together; while that made from wintergreen alone finds no better market. Mr. Kennedy remarks that the oil of birch should be sold under its proper name, and that it might even deserve a place, under this name, in the Pharmacopœia.—Am. Jour. Phar., February, 1882, pp. 49–53.

Oil of Wintergreen—Antiseptic Value.—Gosselin and Bergeron ("Archives Générales," January, 1881) have found that wintergreen is almost as antiseptic as carbolic acid. They have used two alcoholic solutions of varying strength; the stronger is composed of 5 parts oil of wintergreen, 100 parts alcohol, and 50 parts water; the weaker, of 2½ parts of oil of wintergreen, 100 alcohol, and 100 water. No toxic effect or caustic action resulted from the use of these solutions. It is probable that while the cost of this antiseptic solution may be as claimed by Gosselin and Bergeron, still physicians engaged in rural practice may find in the use of these alcoholic solutions of wintergreen oil an economical means of practicing antisepticism, as wintergreen is an exceedingly common plant east of the Mississippi River.—Am. Jour. Phar., September, 1881, p. 474; from Chicago Med. Rec.

ALCOHOLS.

Alcohols—Crystalline Compound with Chloride of Calcium.—J. B. Heindl has reinvestigated the compounds of chloride of calcium with ethyl alcohol, isobutyl alcohol, and fermentation amyl alcohol, and assigns to them the formula $CaCl_2, 3C_2H_6O$; $CaCl_2. 3C_4H_{10}O$; and $CaCl_2, 3C_5H_{12}O$. He failed to confirm the existence of compounds containing both alcohol and water, and attributes the discrepancies of the former analyses to the methods employed in drying the crystals, it being necessary in this to attend to the precautions already detailed in Lieben's paper (Wien. Akad. Ber., 82 (2), p. 1255–1283) on compounds of chloride of calcium with fatty acids.—Journ. Chem. Soc., January, 1882, p. 27; from Monatsb. Chem., 1881, p. 200–201.

Alcohol—New Instrument for Determining the Strength.—At a recent meeting of the Suffolk District Medical Society of Massachusetts, the secretary showed a small and simple instrument, of French manufacture, for determining the strength of alcoholic solutions. It consists of a small strip of wood, which is laid across the top of a tumbler or wineglass containing the solution to be tested; this acts merely as a holder for a piece of capillary tube, such as thermometers are made of, which is slid vertically through an opening in the wood until the lower end of the tube just touches the surface of the liquid. As soon as the tube touches the liquid, the latter is drawn up by capillary attraction, and the point to which it rises is read off on the scale on the tube, which is graduated from 0 to 20: these numbers indicate the per cent. of alcohol. Or better, the liquid is sucked up a little way, by applying the mouth to the upper end, and allowed to run down to a point where it remains fixed.

The basis of the method is, that in the same tube water is drawn up by capillary attraction very much higher than alcohol, so that when alcohol is present in the water it lessens the height to which the mixture will rise in a capillary tube.

The scale goes only as high as twenty per cent. of alcohol, but with stronger solutions a small quantity may be taken and diluted with once or twice its volume of water before testing.

By this instrument one may readily determine the per cent. of alcohol in dry wines, but not in those containing much sugar, as this acts in a way similar to alcohol.—New Rem., June, 1882, p. 179.

Alcohol—Deodorization by Electrolysis.—Daudin has observed that the unsaturated aldehydes, which give sharp and unpleasant taste to alcohols, particularly butyl- and amyl-aldehyde, are changed into saturated compounds (alcohols) by electrolytic hydrogen developed in the liquid. The amount of alcohol of good taste, too, that can be gotten from a sample is increased from 25 to 30 per cent. For this hydrogenation they use a copper-zinc couple as prepared by Gladstone and Tribe. For this purpose a zinc plate is hung in a copper solution, where it soon becomes covered with metallic copper, and acquires the property of dissolving with formation of zinc hydrate and liberation of hydrogen. If such an element is brought in contact with dilute alcoholic solutions, of say 40 to 60 per cent., there is immediate absorption of the liberated hydrogen, and the characteristic unpleasant odor of the crude alcohol solution disappears quite rapidly. If now the solution be distilled there is obtained a yield of alcohol 25 to 30 per cent. greater than by the previous methods, and much better tasting. For the technical details of this important method reference must be had to the original communication.—Am. Jour. Phar., May, 1882, p. 215; from Bull. de la Soc. Chim., 36, p. 273.

Rum—Composition and Examination.—H. Beckurts has examined genuine and artificial rums with the results below given. Genuine rum, obtained by distilling fermented molasses, is at first colorless, but acquires a brown color on standing in casks. Artificial rums are produced by coloring spirits of wine with burnt sugar and flavoring with ethyl acetate and butyrate, essence of violets, infusion of raisins and locusts. Extract of oak-bark and tincture of catechu are often added.

A rum-essence is also sold which, added to spirit of wine, produces an artificial rum without any further addition. Such an essence is produced by distilling a mixture of 75 kilograms of 90 per cent. (by vol.) alcohol, 50 kilograms of wood vinegar, 30 kilograms of sulphuric acid, 20 kilograms of binoxide of manganese, and 10 kilograms of potato-starch, coloring the distillate brown with burnt sugar. The most important constituents besides alcohol are the ethyl compounds of various organic acids, especially formic acid. It is difficult to distinguish chemically between genuine and artificial samples of rum, especially because extractive matter is generally if not always added to the genuine product at the place of manufacture. In the samples examined, the results of which are shown in the following table, the extractive matter was found to consist mainly of sugar or saccharine matter, and had no rotatory action on polarized light when in aqueous solution.

JAMAICA RUM FROM:	Sp. gr.	Alcohol, per cent. by vol.	Extract, per cent.	Ash, per cent.
1. London Docks, ...	0.885	75	0.668	0.023
2. Glasgow Docks, ...	0.875	75	4.800	0.089
3. Bremen, ...	0.875	90	0.568	0.031
4. Obtained direct, ...	0.910	63	2.047	0.098
5. Bremen, ...	. . .	75	0.031	0.025
6. Bremen, ...	0.870	63	. . .	. . .
7. Brunswick, ...	0.875	75	. . .	. . .
8. Brunswick, ...	0.875	75	. . .	. . .
9. So-called artificial, ...	. . .	48	0.469	0.033
10. So-called artificial, ...	. . .	72	0.926	0.021

With the exception of No. 5, which was colorless, the above were all more or less darkly colored. The statement of Carles that white of egg will remove from genuine rum the coloring matter taken up from the cask, but has no action on sugar, led the author to try the effect on the above samples. None of them were decolorized; nor were solutions of burnt sugar and of catechu. Ferrous sulphate, according to Carles, leaves artificially colored products unacted on. Nos. 1, 2, and 3 were turned distinctly green; Nos. 4 and 5 indistinctly dark-green; Nos. 9 and 10 unchanged. The test merely shows the presence or absence of burnt sugar.—Jour. Chem. Soc., January, 1882, p. 102; from Arch. d. Pharm. (3), 18, p. 342–346.

Beer—Examination for Foreign Bitter Principles.—The following method is based on experiments made by Professor Dragendorff in conjunction with Messrs. Kubicki, Jundzill, and Meyke. About 2 liters of the beer to be examined are evaporated on a water-bath until the greater part of the carbonic acid and about one-half of the water has been volatilized. The hot liquid is treated with basic acetate of lead until no further precipitate is produced. The liquid is filtered as rapidly as possible, and the excess of lead in the filtrate removed with sulphuric acid. The filtrate is neutralized with ammonia to faint acid reaction, evaporated to 250 to 300 c.c., mixed with 4 parts by volume of absolute alcohol, and allowed to stand twenty-four hours. The alcohol (after decantation or filtration? Rep.) is then driven off by distillation, and a portion of the residue shaken up successively with light petroleum, benzene, and chloroform, and another portion is treated in a similar manner, having previously been rendered neutral by ammonia.

Pure beer prepared from malt and hops exhibits the following reactions: Light petroleum absorbs only a small quantity of solids and liquids contained in the beer. The solids have no bitter taste, and give a yellow color with sulphuric acid. Benzene and chloroform give the same reactions. Similar results are obtained from the portion that has been neutralized completely with ammonia. *Beer-wort* behaves like fermented beer.

According to the above method, the following hop surrogates added to the beer can be detected:

1. *Wormwood.*—With light petroleum; the acid solution gives an oil of peculiar odor, cotaining a portion of the bitter principle. By evaporating the extract and treating the residue with sulphuric acid, a brown solution is obtained, which gives the reactions characteristic of absinthin. Similar results are obtained with benzene and chloroform.

2. *Ledum palustre* gives an ethereal oil having the penetrating odor of the plant. Benzene and chloroform extract bitter principles.

3. *Menyanthes trifoliata* (Buck Bean).—Petroleum extracts but traces of the bitter principle; benzene, however, and especially chloroform, take up large quantities. The bitter principle (menyanthin) is recognized by its taste and the characteristic odor it possesses when treated with dilute sulphuric acid.

4. *Quassia*, like the preceding, is absorbed from its solutions by benzene and chloroform, petroleum extracting only traces.

5. *Colchicum.*—Light petroleum remains inactive, benzene absorbs small quantities of colchicine and colchiceïne.

6. *Cocculus Indicus.*—Petroleum and benzene are inactive. Chloroform, or, better, amyl-alcohol, extract the bitter principle picrotoxin.

7. *Colocynthin.*—Chloroform extracts large quantities.

8. *Willow-bark.*—Salicin is taken up freely by amyl-alcohol.

9. *Strychnine* can be extracted only from ammoniacal solutions, benzene and chloroform being the best solvents.

10. *Atropine*, and

11. *Hyoscyamine* are extracted from ammoniacal solutions by benzene and chloroform.

Certain bitter principles of
Capsicum annuum,
Daphne Mezereum,
Cnicus benedictus, and
Erythræa Centaureum are extracted by benzene and chloroform from acid solutions.

12. *Aloes.*—In order to extract this the above method requires modification. The beer is treated with acetate of lead and shaken up with amyl-alcohol. The residue of evaporation gives the characteristic taste and properties of aloes.

13. *Gentian.*—This also requires a modification of the method. After precipitating with normal acetate of lead, as in the above, the mixture is filtered and the excess of lead separated by sulphuric acid. The solution is evaporated, the residue acidified by nitric acid and subjected to dialysis. The neutralized solution (? Rep.) is again treated with normal acetate of lead, filtered, and the filtrate treated with basic acetate of lead and ammonia. This precipitates gentianin, which can be isolated from its solution in sulphuric acid by benzene or chloroform.

14. *Picric acid* is not wholly precipitated by basic acetate of lead, and cannot be extracted with safety by the above-named solvents. Brunner proposes to digest wool for twenty-four hours in the beer previously acidified with hydrochloric acid. The wool is subsequently washed, and the picric acid extracted by ammonia.—Jour. Chem. Soc., January, 1882, pp. 103–104; from Chem. Centralbl., 1881, pp. 285–288 and 299–303.

Ether—Separation from Certain Admixtures.—In separating quinine and amorphous alkaloids from the mixed cinchona alkaloids by agitation with ether, the subsequent removal of the ethereal layer from undissolved alkaloid and from the aqueous solution is an operation of some little difficulty, and not satisfactorily accomplished either by the use of a pipette or ordinary separatory funnels. To obviate these difficulties Mr. C. I. H. Warden has devised an apparatus which is essentially a filtering siphon, and consists of a siphon-shaped tube of thick glass, of small bore, on the shorter limb of which a small funnel has been blown, which is provided with a narrow projecting lip and with a ground flat rim, while the other end of the larger limb is drawn out. The shorter limb passes through a cork, carrying a second short bent tube, and fitting the neck of a long narrow flask in which the agitation is conducted. The funnel being lightly stuffed with cotton-wool and a piece of filtering-paper tied over the mouth, it is introduced beneath the surface of the ethereal layer, and held in position by the cork. On gently blowing through the short bent tube the ether is forced through the filter and fills both ends of the siphon, and then continues to flow automatically into a reservoir placed for its reception. As the ethereal stratum diminishes the tube carrying the funnel is depressed, until its flat surface is within a line or so from the surface of the aqueous layer, and is engaged in the precipitate. When this occurs air is again blown through the small tube, which may conveniently have a piece of india-rubber tubing attached, and this is continued until drops of ether escape only at long intervals. The cork carrying the tubes is then removed, fresh ether added, the mixture shaken, and the operation repeated as frequently as may be necessary. Obviously the process may be applied to any operation in which the separation of ether from aqueous liquids, etc., is necessary. —Phar. Jour. Trans., May 6th, 1882, p. 906; from Jour. of the Soc. of Chem. Industry.

Ethyl Peroxide—Preparation.—According to Berthelot this compound is obtained by passing a slow current of perfectly dry and strongly ozonized oxygen over anhydrous ether. The ozone is gradually, though incompletely, absorbed, and a dense syrupy liquid is formed, which becomes viscous, but does not solidify at —40°. When heated it distils partially, but finally decomposes with a violent explosion. It is dissolved by water, and is at the same time decomposed into alcohol and peroxide of hydrogen. Estimation of the amount of peroxide of hydrogen formed by its decomposition showed that the composition of ethyl peroxide is Et_4O_3. The production of ethyl peroxide by the direct action of ozone furnishes a method of preparing peroxide of hydrogen by means of the latter, the reaction with water being represented by the following equation: $Et_4O_3 + 3H_2O = 4EtHO + H_2O_2$.—Jour. Chem. Soc., August, 1881, p. 709; from Compt. Rend.

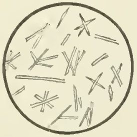
Bromide of Ethyl—Value in Epilepsy and Hysteria.—Olier and Bourneville ("L'Union Medicale") recently reported to the French Biological Society the results of two months' experimentation with bromide of ethyl on epileptic and hysterical patients. In the hysterical cases they found that the remedy, administered at the beginning of the attack, completely checked the convulsions. In the epileptics, on the attack coming on during a tonic period, the bromide of ethyl appeared to act sometimes in such a way as to suppress the convulsions and produce complete muscular relaxation; often the attack was diminished in intensity and duration; sometimes the remedy was without effect.—Am. Jour. Phar., September, 1881, p. 477; from Chic. Med. Review, 1881.

Acetic Ether—Working Process.—The following is given in "Dingl. Polyt. Jour." (231, 242): 150 kilos fused acetate of sodium, 150 kilos alcohol of 23 per cent. (Tralles), and 135 kilos sulphuric acid, 66° B., are distilled with steam in a large copper still with jacketed bottom. The total quantity of crude ether was 233 kilos. Another quality of acetate of sodium gave 363 kilos of crude ether from a mixture of 250 kilos acetate of sodium, 250 kilos alcohol, and 225 kilos sulphuric acid. The crude product is agitated with lime, the residue separated, and the ether rectified with steam heat. From the above 363 kilos crude ether 334 kilos rectified ether are obtained. To produce *absolute acetic ether* the rectified product is washed with water, then treated with potash and distilled.—Jour. Chem. Soc., March, 1882, p. 296.

Normal Ethyl-sulphate—Preparation from Ethyl-iodide.—Two bodies corresponding with the empirical formula, $C_4H_{10}SO_4$, can exist, one being the normal ethyl-sulphate and the other the ethyl salt of isethionic acid. Neither has hitherto been obtained synthetically by the action of ethyl-iodide on the silver salts of the corresponding acids. The first compound was obtained by Wetherill in 1848, by the action of sulphuric acid on ethyl ether. In 1876, Mazurowska, by the action of sulphuryl chloride on absolute alcohol, obtained a compound, which she thinks is normal ethyl-sulphate, and which is different from the ethyl salt of Wetherill, of which only small quantities are formed at the same time. N. Stempnevsky has now obtained, by the action of ethyl-iodide in ethereal solution on isethionate of silver, a compound which, on decomposition with water, gave isethionic acid, and was therefore ethyl-isethionate. Under similar circumstances, silver sulphate and ethyl-iodide gave a liquid of sp. gr. 1.167, with an odor of peppermint, and leaving a greasy spot on paper; it could be only partly distilled without decomposition. On heating it with water, ethyl alcohol, and sulphuric and ethyl-sulphuric acids are formed. This compound is identical with that obtained by Wetherill, and described as normal ethyl-sulphate, but different from the "neutral ethyl-sulphate" of Mazurowska, the nature of the last-named compound remaining unexplained.—Jour. Chem. Soc., May, 1882, p. 487; from Jour. Russ., Chem. Soc., 1882, 95–99.

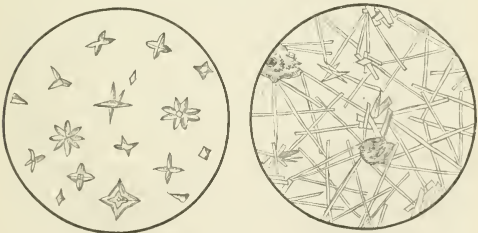
Sodium Ethylate—Improved Process of Preparation—Mr. Linville H. Smith finds that, owing to the hygroscopic character of the absolute alcohol and the sodium ethylate, and to the length of time during which these are exposed during the preparation, the "caustic alcohol" of Dr. B. W. Richardson is of varying strength. As a remedy he suggests the following modification of Dr. R.'s formula (see Proceedings, 1879, p. 408), which is based upon the idea of converting a weighed quantity of sodium into ethylate, and making the solution of a 10 per cent. strength. For this purpose, 20 c.c. of absolute alcohol are placed in a test-tube, and the tube closed with a perforated cork, bearing a small tube drawn to a fine point. The test-tube is then placed in a bath of ice-water; 0.68 gram of sodium, having a perfectly bright surface, is then cut into three equal pieces and immediately replaced in the hydrocarbon oil, in which it is kept. One of the pieces of sodium is then quickly dried, to remove the oil, dropped into the alcohol, and the cork replaced in the test-tube. After this piece of sodium is dissolved, which is rapidly accomplished, a second piece is added, and finally the third in the same way as the first; but it will be necessary from time to time to remove the test-tube from the ice-bath, so as to allow the temperature to rise and hasten the solution of the sodium, care being taken not to allow the reaction to go on too fast. The solution is then immediately transferred to small bottles and kept from the light. It will be a perfectly colorless and mobile liquid, and had not changed, in the author's experience, after standing two weeks.

FIG. 61.



a. Sodium Ethylate—Crystals.

FIG. 62.



b. From a dilute solution

c. From a strong solution.

A 25 per cent. solution remains liquid at the boiling-point, but on cooling becomes a solid mass of crystals. By evaporating the solution to dryness, the ethylate is obtained in the form of a white powder, but it is not as permanent in the solid condition as in the form of a solution, a brown layer soon forming on the surface. Two forms of crystals were obtained by the author. The one, shown at *A* (Fig. 62), from a comparatively weak solution; the other, from a more concentrated solution were needle-shaped crystals, as shown at *B*.—New Rem., April, 1882, p. 104–105.

Sodium Ethylate—Preparation.—Hager gives the following directions: 100 grams absolute alcohol are placed into a glass flask of 350 ccm. (about 12 oz.) capacity; small pieces of metallic sodium, of the size of a pea or bean, are then gradually added, and the flask is closed with a cork, through which a long open glass tube passes for the purpose of condensing the alcoholic vapors evolved during the reaction. The addition of sodium is continued, until 12 grams of the metal have been used, repeated agitation being required towards the end of the process. The hot thickish liquid is now poured into a porcelain dish, the flask is rinsed out with a little hot alcohol, any undissolved sodium is carefully removed, and the liquid is heated until, after cooling, it will completely solidify, when the mass is rubbed into a fine powder and carefully preserved. Thus prepared it contains some alcohol in combination, which may be expelled by heating it to 200° C. In contact with water it is decomposed into alcohol and sodium hydrate. Its action is milder than that of caustic soda, and it is more conveniently applied than the latter. Richardson's sodium ethylate (see Proceedings, 1879, p. 408) is a clear solution of 1 part of the above compound in 3 parts of absolute alcohol. Freshly prepared it is colorless; but brown yellow if made from old ethylate.—Am. Jour. Phar., November, 1881, p. 574; from Phar. Centralh., 1881, 359.

Oil of Wine—Characters as obtained during the Technical Preparation of Ether.—Mr. E. C. Hartwig remarks, that all existing researches on the oil of wine relate to a product obtained either by the distillation of the sulphethylates, or as a by-product from the preparation of ethylic ether on the small scale. No examination has been made of the oil of wine obtained in considerable quantity during the technical preparation of ether. This oil proves to be essentially distinct, both from the "heavy" and the "light" oil of wine as examined by previous authorities. From the former it is distinguished by the absence of sulphur, and by its permanence when boiled with water and alkalies. From the latter it is distinguished by its variable composition, being a mixture of hydrocarbons, ethers, and ketones. Among hydrocarbons "di-iso-amylene," $C_{10}H_{20}$, was obtained. An ethylamin-ether was recognized in the fraction boiling between 110° and 120°. Two ketones were obtained in a state of purity, an ethyl-amyl ketone and a methylhexyl-ketone.—Chem. News, September 2, 1881, p. 122, from Jour. Prakt. Chem., No. 10. 1881.

Chloroform—Questionable Value of Yvon's Test.—Mr. Regnault draws attention to the unreliability of Yvon's permanganate of potassium test under certain conditions. Absolutely pure chloroform should not change the color of the test liquid, which is composed of a solution of permanganate of potassium containing a certain proportion of potassium hydrate. The smallest trace of alcohol, however, will change the crimson color to green by reducing the permanganate to manganate. Mr. Regnault finds that nearly all chloroform that he has examined turned this solution green during periods varying from five minutes to several hours, notwithstanding that ordinary tests determined their suitability for anæsthetic purposes. On the other hand, simple treatment of such chloroform with sulphuric acid, decantation, treatment with magnesia, and filtration, rendered all these chloroforms inactive to the test, as was also chloroform that had been so far decomposed by light as to be of almost intolerable odor.—Chem. and Drug., April, 1882, p. 163, from Jour. de Phar. et de Chim., April, 1882.

Chloroform—Detection in Cases of Poisoning.—D. Vitali brings the liquid which has been distilled from the intestines into a three-necked flask, and conducts a current of hydrogen through the same. The hydrogen, which escapes through a glass tube provided with a platinum point, is then ignited. If chloroform is present in the liquid, it will be carried along with the hydrogen, and burn with the formation of hydrochloric acid. If a piece of fine copper wire be now held in the flame, the latter, in consequence of the formation of cupric chloride, will assume an intense green color. A small, scarcely visible drop of chloroform, when mixed with 30 cubic centimeters of water, will produce the green coloration very perceptibly.—Am. Jour. Phar., April, 1882, p. 158; from Chem. Zeitung, 1882, No. 3, p. 47, from Giorn. Farm. Chem., 30, p. 529.

Chloral Hydrate—Large Dose.—Contrary to the physician's directions, a man suffering from delirium tremens took in about half an hour 15 grams of chloral hydrate without any ill effects. The editor of "Pharm. Zeitung" (1881, No. 98) directs attention to a case which occurred in Elberfeld in 1874, and in which the same dose, 15 grams, produced death. The maximum dose of chloral hydrate is, in Germany, assumed to be 3 to 4 grams, and in a day 8 grams.—Am. Jour. Phar., March, 1882, p. 119.

Isobutylic Acetal—Preparation.—According to S. Œconomides, this compound is obtained by passing a current of hydrochloric acid gas to saturation into a well-cooled mixture containing equal weights of isobutylic aldehyde and of absolute alcohol. The upper of the two layers formed is a mixture of chlor-ethyline and of isobutylic acetal. This product is mixed with sodium ethylate, and heated for several hours to 100°. Isobutylic acetal is then separated by means of water.—Chem. News, September 30, 1881, p. 169; from Bull. Soc. Chim. de Paris, No. 9, 1881.

Acetone—Determination in Wood spirit.—H. Kramer recommends the following: Into a test-tube, holding 50 c.c., pour 10 c.c. of binormal solution of soda and 1 c.c. of the sample under examination; add 5 c.c. of a binormal solution of iodine, and shake the mixture. The precipitate of iodoform is dissolved in 10 c.c. of ether and 5 c.c. of the solution are evaporated in a tared watch-glass. The residue represents iodoform, which is calculated as acetone.—Chem. News, April 6, 1882, p. 152; from Monit. Scient. Quesneville, January, 1882.

Iodoform—Formation.—Dr. Hager enumerates the substances which, along with iodine and an alkali, are concerned in the formation of iodoform. 5 c.c. of the liquid to be tested are treated with 5 to 10 drops of solution of caustic potassa, heated to 50°; and a solution of iodine in iodide of potassium is added, drop by drop, until the mixture is faint yellow. In the event that this yellow color does not disappear in a few minutes, a few drops of potash solution are carefully added. After several hours a yellow deposit of iodoform will be formed in the liquid if either of the following substances were present in the liquid tested: Acetone, ethyl-alcohol, aldehyde, amylene, benzol, butyl-alcohol, capryl-alcohol, dulcin, acetic ether, gum, carbohydrates (sugar), meconic acid, kinic acid, lactic acid, some volatile oils (oil of turpentine), and protein substances. The formation of iodoform does not take place with methyl-alcohol, ethyl-ether, chloride of ethylene, amyl-alcohol, chloral-hydrate, chloroform; acetic, tartaric, malic, formic, benzoic, succinic, butyric, uric, salicylic, mucic, valerianic, cinnamic, and oxalic acids.—Arch. d. Pharm., August, 1881, p. 121; from Phar. Centralh., No. 20, 1881.

Iodoform—Preparation.—Mr. R. Rother reviews the different processes that have been recommended for the preparation of iodoform, and recommends the following: Into a convenient vessel—a flask, evaporating-dish, or, best, a deep, enamelled kettle—place 16 troy ounces of crystallized carbonate of sodium, 4 fluid ounces of alcohol, and 24 fluid ounces of water. Apply heat, and gradually add 4 troy ounces of iodine, about one-fourth ounce at a time. When the dark color of the solution has been discharged, set the mixture aside to cool. Now make a solution of 8 troy ounces of bromine in 4 pints of water by the aid of 1 troy ounces of bromide of potassium or sodium. Pour this solution gradually and at short intervals into the iodine mixture, having, in the meantime, added 2 fluid ounces of alcohol and 8 troy ounces of carbonate of sodium. Apply heat until the color disappears, decant the clear liquid from the iodoform, rinse this upon a filter, wash it with water, and expose it in the open air to dry. If, on heating the mixture for a moderate time, the color should not promptly disappear, more carbonate of sodium must be added. The quantity of bromine will suffice for a triple liberation of the iodine from the bases; hence the later intervals of addition must be extended in accordance, whilst the heating is in progress.—The Pharmacist, February, 1882, pp. 53–58.

Iodoform—Preparation.—Mr. George R. Bell has experimented with Cornélis and Gille's (Jour. de Pharm. (3) xxii., pp. 196, 361). Bouchardat's (Proceedings, 1875, p. 718), and Filhol's (Ibid., p. 719) processes for making iodoform, and finds Filhol's to give not only the greatest yield (as already pointed out by Hans M. Wilder, see Proceedings, 1876, p. 291), but also to be a quicker process to work by than Bouchardat's, while the crystals obtained were much handsomer than by the other processes. Cornélis and Gille's process was very unsatisfactory, the yield being small and of an inferior appearance. By using pure materials Filhol's process will yield almost an odorless iodoform, the product having only a faint saffron odor. Mr. Bell attributes the disagreeable odor of ordinary iodoform to the presence of amylic alcohol in the alcohol. Such iodoform, also, formed a reddish-colored solution in alcohol, resembling that which the author had obtained by dissolving commercial iodoform exposed to the sunlight. The yield of iodoform by Bouchardat's process was 17.27 per cent.; in two experiments by Filhol's process, 28.5 and 36.35 per cent. respectively.—New Rem., March, 1882, pp. 68, 69.

Iodoform—Detection of Small Amounts.—On heating an alkaline solution of resorcin with even very small amounts of iodoform a red coloration is produced, which again disappears on the addition of an acid. This reaction may be readily employed for the detection of small amounts of substances yielding iodoform, as alcohol, acetone, etc. As is known, such substances are recognized by warming the liquid to be examined, adding a solution of iodine in potassium iodide or potassium carbonate, and then sufficient solution of sodium hydrate, drop by drop, until the brownish-yellow color is nearly discharged. On agitation and standing, the iodoform separates as a bright-yellow crystalline precipitate, which, under the microscope, appears in the form of regular six-sided tables or roundly-pointed laminæ. As on the one hand small amounts of iodoform remain dissolved, particularly in alcoholic liquids, and on the other hand the microscopic examination of the precipitate is somewhat circumstantial, it is recommended to gently warm the liquid containing iodoform, obtained by the above method, with the further addition of alkali and a little resorcin. The above-mentioned characteristic red coloration of the liquid then appears.—Amer. Jour. Phar., April, 1882, p. 159; through Pharm. Centralhalle, 1882, No. 2, p. 15; from Ber. d. Oest. Ges., iii, p. 75.

Iodoform—Solvents.—According to Dr. Vulpius, of Heidelberg, the following ethereal oils and hydrocarbons dissolve the iodoform in the proportions stated:

Petroleum ether dissolves	1 per cent.
Benzin "	1.5 "
Oil of turpentine "	4 "
" lavender "	7 "
" cloves "	8 "
" fennel "	9 "
" lemon "	9 "
" rosemary "	9 "
" cinnamon (cassia) "	14 "
" caraway "	16 "

The difference in solvent power of these liquids is quite remarkable. Perhaps there is a certain connection between solvent power and oxygenated constituents, the former increasing with the latter. A solution of iodoform in benzin and petroleum ether soon acquires a rose color. A 5 per cent. solution of iodoform in chloroform soon assumes a dark-red color, which points to an energetic chemical action.—New Rem., June, 1882, p. 180.

Iodoform—Solubility in Water.—Dr. Schadewald gives the following method for the preparation of an aqueous solution of iodoform: A large glass flask is filled ½ full of distilled water, and iodoform is added in the proportion of 2 grams per liter. The flask is stoppered with a pledget of cotton-wool, and heated to 80°–90° C., at which temperature violet vapors of iodoform are developed. This temperature is maintained for 20–30 minutes, the liquid is allowed to cool slowly and is filtered. The filtrate, which is handsome golden yellow, and permanent, contains from 0.5 to 0.7 per cent. iodoform, and possesses the physiological action of the dry iodoform. The solubility of the iodoform is explained by the assumption that the iodoform vapor enters into a loose combination with the water vapor, and thus, similarly to salts containing water of crystallization, becomes more soluble in water.—Pharm. Ztg., 30, 1882, p. 220.

Iodoform—Compounded with Strychnia, which see, under "Alkaloids."

Iodoform—Deodorization.—The following substances are recommended as deodorizers of iodoform in "Wiener Med. Blätter:" Balsam of Peru, 1 part to 10 of iodoform; essential oils of anise-seed, peppermint, fennel, and bergamot, 1 part to 20 of iodoform. These only modify the odor and cannot be used in larger quantity without danger of also modifying the action of the medicament, since they absorb the iodine spontaneously set free from the iodoform, and upon which its medicinal effect depend. The best deodorizer for iodoform is *tonka bean*. One bean, either whole or split, on being placed with from 150 to 200 grams of iodoform in a tightly closed glass bottle, is sufficient to deodorize it. For a smaller quantity, one drop of the alcoholic or ethereal tincture may be used. The antiseptic property of the iodoform is not in the least diminished by this method.—Drug. Circ., October, 1881, p. 151.

Iodoform—Disguising the Odor.—In discussing the value of the different substances recommended for this purpose Hager states that the activity of iodoform depends upon the gradual liberation of iodine, and that the addition of all substances should be avoided which enter into combination with iodine. Hence all drugs containing tannin should be discarded; even balsam of Peru resorbs much iodine, and should never be used in larger proportion than 1 part to 10 parts of iodoform. Volatile oils of anise, fennel, peppermint, etc., appear to be the most useful, only 1 part of these to 20 parts of iodoform being necessary.—Amer. Jour. Phar., September, 1881, p. 456; from Phar. Centralballe, 1881, No. 12.

Tonka bean, the seed of Dipterix odorata, has been recommended for the same purpose by V. Mosetig. The seed, which contains conmarin, entire or split longitudinally, is placed into a bottle containing from 150 to 200 grams of iodoform; the latter loses its peculiar odor in a short time, which is replaced by a faint bitter-almond odor. Or the iodoform may be rubbed up with a small quantity of the alcoholic or ethereal extract of tonka.—Ibid.; from Allg. Wien. Zeit., June 14.

Iodoform—Correctant of Odor.—Otto Ruetz finds the substance best adapted for diminishing or concealing the disagreeable odor of iodoform to be the oil of thyme, to which a little thymol may be advantageously added. It is preferable to oil of peppermint, oil of bitter almond, etc., and, as an example, it is stated that for a solution of from 1 to 2 grams of iodoform in 30 grams of collodion, the addition of 1 decigram thymol is sufficient.—Amer. Jour. Phar., March, 1882, p. 119; from Phar. Ztg., 1881, No. 94.

Fusel Oil—Qualitative and Quantitative Determination in Alcohol.—Hager recommends for the detection of the presence of fusel oil that a rolled filter-paper be dipped into the alcohol to be examined; on allowing the moistened paper to dry at a temperature not exceeding 25°, the alcohol evaporates, leaving the fusel oil, which reveals itself by its characteristic smell. This test is more delicate if one-tenth of its volume of pure glycerin is added to the diluted alcohol. If only traces of the fusel oil are present the roll of filter-paper is placed in a cylindrical tube open at both ends; the lower end is closed with the finger, and the mixture of alcohol, water, and glycerin poured in to thoroughly moisten the paper. In the course of 24 hours the smell of fusel oil is easily recognized, and remains permanent for more than a week. If ethereal oils are present the mixture is distilled at the heat of the water-bath, and the residue mixed with an equal volume of water and filtered; only traces of the oil pass through the filter, and the method described can then be used.

Owing to the difference of vapor tension of ethyl and amyl alcohols the two liquids may readily be separated by fractional distillation. If the spirit contains less than 70 per cent. alcohol, both water and fusel oil remain in the residue of distillation. The author then gives further directions, which are best consulted in the original.—Jour. Chem. Soc., March, 1882, p. 339; from Chem. Centralbl., 1881, pp. 712–714.

Fusel Oil—Jorissen's Color Reaction.—A few years ago A. Jorissen announced that he had discovered a color-reaction for fusel oil, having noticed that the commercial oil gave a magnificent red color with aniline and hydrochloric acid. This method of detecting fusel oil would have been very valuable if it had not lately been found by K. Foerster that the color reaction is due, not to the fusel oil itself, nor to amylic alcohol, but to an accompanying impurity, which the last-named chemist ascertained to be *furfurol* ($C_5H_4O_2$). This body has the property of forming fine red but fugitive compounds with bases of the aromatic series.—New Rem., June, 1882, p. 181; from Ber. d. Deutsch. Chem. Ges., 1882, p. 230.

Amylic Alcohol.—The disagreeable odor of iodoform due to its presence in the ethylic alcohol used, see Iodoform.

Phenyl—Compounds with Boron and their Antiseptic Value.—A. Michaelis and P. Becker, considering that boric acid itself possesses antiseptic properties, and presuming that a phenyl compound of the acid must be possessed of such properties in a still higher degree, have prepared and studied some compounds of the kind. The mother substance is

Phenyl-boron chloride ($C_6H_5BCl_2$), which is formed by the mutual reaction of boron chloride and mercuric phenide. By slowly dropping this into a tall glass vessel containing water,

Monophenyl-boric acid ($C_6H_5B(OH)_2$), is deposited in the form of a white powder, which is dissolved by heating the mixture, and crystallizes out on cooling in the form of fasciculated needles. Monophenyl-boric acid is a weak acid, reddening blue litmus-paper but very slightly; it is easily soluble in hot, but more difficultly in cold water. It is also soluble in alcohol and in ether. It melts at 204° C. Heated in a current of steam the acid distils over. When distilled by itself it loses water ($C_6H_5B(OH)_2 = C_6H_5BO + H_2O$), phenyl-boron oxide distilling over. The same change takes place when the crystalline acid is kept for any length of time under a desiccator. It combines with sodium to form an easily soluble crystalline salt; also with potash, calcium, and silver, as well as with ethyl, to form monophenyl-ethyl-borate ($C_6H_5B(OC_2H_5)_2$).

The authors consider that there is hope of phenyl-boric acid and its salts being classed among therapeutic agents. The acid has a mild, rather pleasant aromatic taste. Taken internally it produces no irritation, and it can be taken in comparatively large doses. Its antiseptic property is five to ten times greater than that of its sodium salt, its solution 1:10 000 retarding and one of 1:1000 completely preventing the development of bacteria.—Chem. and Drug., April, 1882, p. 164; from Ber. d. d. Chem. Ges., February 13th, 1882.

Pure Phenol—Preparation.—In order to prepare pure phenol, W. Alexejeff adds 5 per cent. of water to the commercial substance, and, after having melted the mixture, allows it to stand. The crystals which gradually form are drained, and after repeating the operation two or three times, the product is distilled. Calvert stated that when 4 parts of phenol were agitated with 1 part of water at a temperature below 4°, a hydrate with the composition $2PhHO + H_2O$ (m. p. 16°) was formed. The author has been unable to confirm this observation. He finds, however, that when phenol is allowed to stand for several months with an excess of water, crystals are formed which melt at 37°.—Jour. Chem. Soc., August, 1881, p. 723; from Bull. Soc. Chim. (2), 35, p. 379.

Carbolic Acid—Improved Process of Manufacture.—The process which at present is followed by manufacturers of carbolic acid, consists in treating the high-boiling fractions of coal-tar (over 140° C.) with dilute soda solution, and decomposing the aqueous solution of sodium carbolate with hydrochloric acid. In this process all the caustic soda is lost, the chloride of sodium found being practically worthless. Mr. R. Heinze has now found that, under certain conditions, particularly under observance of certain degrees of concentration and temperature, a total separation of phenol may be accomplished by the action of carbonic acid. The partial decomposition of phenol sodium solution by the action of carbonic acid gas has long been known, but a complete separation of the phenol had not been considered possible. The requisite carbonic acid gas is proposed by

Mr. Heinze to be derived from the chimney gases of the works. By means of a steam-jet apparatus, the gases are aspirated, and, under considerable pressure, are conducted through an iron pipe into the vat containing the phenol-sodium liquor, the pipe ending, near the bottom, in a broad sieve-like head. According to the smaller or larger percentage of carbonic acid in the gas, the carbolic acid gradually separates as an oily, red-brown upper layer, which, though still impure, has already an aromatic odor. The crude acid is then subjected to the same treatment as in the present process, viz., fractional distillation. The soda being converted into carbonate in this process, it may be reconverted into caustic soda by heating its solution with a thin milk of lime in the usual manner.—New Rem., March, 1882, p. 90; from Jour. f. Gasbelencht. u. Wasserversorg., through Neuste Erfind. u. Erfahr., 1881, p. 517.

Carbolic Acid—Determination in Urine.—Professors A. Cloëtta and Ed. Schaer have made comprehensive experiments with the object of determining whether, and under what conditions, carbolic acid may be present in urine, in what form it may exist, and in what form it is eliminated from the organism. They have, furthermore, determined the conditions most suitable for the determination of the phenol, which are as follows:

For the determination of carbolic acid in urine, the simplest as well as the only reliable method, applicable equally to large and to small quantities (even less than 100 grams) of urine, consists in the distillation of urine after the addition of sulphuric acid, and subsequent application of tests to the distillate, which may be:

1. Treatment with bromine water, whereby tribromphenol is formed, the smallest quantities of which may be crystallized in characteristic form from alcohol, and serves for subsequent quantitative determination.

2. By the application of mercuronitrate reactions, as below, the color of which, although not intense, is very stable.

The *tribromphenol reaction* occurs when bromine-water, freshly prepared, is added to the solution of the phenol (the distillate), the compound being precipitated from solutions containing 1 part of phenol in 100,000. The at first amorphous precipitate is curdy from more concentrated solutions, milky from strongly diluted solutions, and in the largest dilutions makes its appearance after a time. Under all these conditions, however, the precipitate will assume after a greater or less length of time, a granular microcrystalline structure, and is perfectly identified by the ease with which it may be crystallized from alcohol. Even the smallest quantities of the precipitate, when taken up by alcohol, and allowed to evaporate on a watch-glass, afford characteristic tufts of fine needles, occasionally arranged in feathery form.

The *mercuronitrate reaction* consists in heating the phenol solution (which should be colorless and as free from foreign admixture as possible) with about one-third of its volume of a moderately concentrated (10–15 per cent.) solution of mercurous nitrate (free from mercuric salt), and maintaining a boiling temperature for one or two minutes. Upon cooling, the mixture assumes a more or less intense light blood-red to light carmine-red color, which remains unchanged for many days.—Schweiz. Wochenschr. f. Pharm., Nos. 28, 29, and 30, 1881, pp. 280, 289, and 298.

In connection with the above, the editor (Dr. A. Klunge) draws attention to the reaction of phenol and similar bodies with *oxaniline*. If a few drops of a dilute solution of sulphate of oxaniline are added to a moderately concentrated solution of phenol, followed by a little ammonia, the liquid assumes a magnificent blue color, attaining its maximum after some time. The reaction, which is similar to that of Jaquemin (see Proceedings, 1876, p. 297), surpasses all others in delicacy, giving a distinct color in solutions containing 1 part of phenol in 800 000. Other phenols, such as creasote, thymol, guaiacol, resorcin, and perhaps others, gave, however, nearly the same reaction.—Ibid., No. 30, p. 302.

Carbolic Acid—Impurity.—Carbolic acid being now frequently met with in commerce in metallic vessels, H. Athenstaedt examined a sample by passing sulphuretted hydrogen into the aqueous solution, obtaining at once a dark coloration and after some time a dirty white precipitate. On emptying the vessel, the bottom on the inside appeared rough as if corroded, and the solder was similarly affected in several places.—Am. Jour. Phar., June, 1882, p. 309; from Phar. Zeit., 1882, p. 147.

Carbolic Acid—Decoloring when Red.—Yvon has recommended to the Société de Pharmacie an apparently very simple means of freeing carbolic acid from the coloring substance which it frequently contains. It is only necessary to dissolve the carbolic acid in its own weight of glycerin. The resulting solution may be mixed with water in all proportions. If it be allowed to stand at rest, a more or less thick layer collects on the surface, which contains the whole of the coloring matter. It may be separated by decanting, or by filtering through cotton.—New Rem., June, 1882, p. 173.

Sulpho-phenate and Sulpho-cresylate of Sodium—New Purgatives.—The "Concours Medical" reports that Dr. Rabuteau has experimented with sulpho-phenate and sulpho-cresylate of sodium, and has obtained excellent purgative effects with both. A dose of from 20 to 25 grams (ʒv to vj, gr. xv) will induce seven or eight stools in the course of a day. Those salts are eliminated, almost totally, without any change, and their use is advised in cases of fœtid diarrhœa.—Am. Jour. Phar., March, 1882, p. 137; from Med. and Surg. Rep., February 11.

Resorcin—Therapeutic Effects.—According to Dujardin-Beaumetz and Cullias, resorcin has the following chemical and physiological properties:

1. It shares with salicylic acid, carbolic acid, and other substances belonging to the aromatic series, the property of being an antiferment (in the proportion of 1 : 100), and an antiseptic (1.5 : 100).

2. Resorcin has a toxic power inferior to that of carbolic acid, which may be fixed in the following manner:

a. If taken in quantities of 30 to 60 centigrams (5–10 grains) for each kilogram (2⅕ lb.) of body-weight, it produces trembling and tonic convulsions, and accelerates respiration and circulation, all of which symptoms disappear in one hour. Sensibility and consciousness are unimpaired.

b. The quantity of 60 cgm. (10 grs.) for each kilogram, causes intense vertigo and loss of consciousness; the sensibility is blunted; the clonic convulsions are violent and frequent, and affect the anterior middle of the body of the animal. The pupils are dilated, and the respiration and circulation are excessively accelerated. The temperature is but little affected. All these symptoms disappear from one to two hours.

c. In quantity of 90 cgm. to 1 gram (14.5–15 grs.) for each kilogram, death supervenes in about thirty minutes, preceded by similar symptoms, which are, however, not so violent in the limbs. There appear tetanic contractions of the muscles of the neck. The temperature rises gradually, and, without exception, up to 41° C. (105.8° F.) at the moment of death. There is no tetanus. Rigor mortis sets in about fifteen minutes after death. This shows that resorcin is an excitant of the central nervous system.

3. Resorcin has no influence upon the morphological state of the blood, except when it is brought in direct and actual contact with the liquid blood.

4. Resorcin is a remedy which may be used externally and internally in all diseases due to contagious germs, or in diseases which favor their development and in which other benzol-derivatives have been used.

The antirheumatic, febrifuge, and antipyretic power of resórcin is not yet well defined, and requires further study.

5. The authors express the wish that resorcin, owing to its extreme solubility, its almost total freedom from odor, its lesser toxic power, and its want of causticity may be experimented with in sur-

gical cases in the same manner as carbolic acid is used.—New Rem., January, 1882, p. 7; from Rép. de Pharm., 1881, p. 526.

Glycerin—Preparation from Spent Lyes.—According to the new procedure of H. Fleming, the lyes are submitted to osmosis (dialyzing), the same apparatus being used which serves in the (beet-root) sugar manufacture for dialyzing treacle. A cell is divided into two compartments by means of a dialyzing membrane of parchment paper. Through one of these compartments flows clear water, and through the other flows the lye previously concentrated. The salts of the lye pass through the membrane into the water, while water passes in the opposite direction and dilutes the glycerin. If the solution of glycerin still contains too much saline matter after being once dialyzed, it is concentrated and dialyzed again. These operations are to be repeated till a satisfactory grade of purity has been reached, and the solution is concentrated and finally purified by distillation or concentration. If the lye is strongly alkaline, it is neutralized with sulphuric acid before the operation.

Various attempts have previously been made to extract glycerin from lye, but without any real success. The patented process of Thomas, Fuller & King, of Bristol, approaches, in one respect, nearer, but it fails to remove the considerable proportion of chlorides, especially common salt, present in the concentrated lyes. This removal is essential, because in the subsequent treatment with superheated steam, a considerable quantity of chlorides is carried over along with the glycerin, and cannot be removed by refining with bone-black. As crude glycerin has lately risen to three times its former price, there is scope for invention. The cost of Fleming's process is trifling.—New Rem., September, 1881, p. 287; from Oil and Drug News.

Glycerin—Preparation from Soap-maker's Waste.—According to O'Farrell the waste liquors, after the separation of the soap, are evaporated until all the common salt in them is on the point of crystallization. This concentrated solution of salt is then used to separate the soap from a fresh quantity of saponified liquor, and then again evaporated down to the saturation point. The operation is continued until the liquor is sufficiently rich in glycerin. The salt is then crystallized out, and the remaining mixture of water and glycerin is separated by distillation, during which operation a jet of steam of about 392° F. is introduced into the liquid under treatment, so that ebullition may be perfectly regular and easy during the distillation.—Chem. Journ., May, 26, 1882, p. 323; from Monit. Prod. Chim., May, 1882.

Glycerin—Evaporation under Certain Conditions.—Mr. G. Couttalence, with a view to determining whether any glycerin is volatilized, and consequently lost, in the treatment to which it is subjected by different processes of assay, has made experiments in three directions: 1. The evaporation of pure glycerin; 2. The evaporation of glycerin mixed with sand; 3. The evaporation of glycerin with water added to it several times. The capsules containing glycerin under these different conditions were maintained at a temperature of 194° F. with the following results:

1. Glycerin mixed with water loses its water after being treated at 194° F. for five hours.

2. The evaporation of glycerin then continues at the same temperature at the rate of 0.00317 gram for every square centimeter of surface.

3. The evaporation diminishes rapidly when the temperature is lowered.

4. The evaporation is directly proportional to the surface of the liquid exposed to the air, and increases rapidly on the addition of sand.

5. The quantity of water added to the glycerin influences the evaporation in such a way that the more water that is added, the greater the amount of glycerin that it caries away, without, however, the evaporation being directly proportionate to the quantity of water added.

6. The titration of glycerin cannot therefore be accomplished by evaporation at this temperature.—Chem. Journ., March 3, 1882, p. 126; from Rép. de Pharm., February, 1882.

Glycerin—Reactions and Detection.—E. Donath and J. Mayrhofer recommend for the detection of glycerin in the possible presence of sugar, that the liquid in question be mixed with powdered slaked lime and an equal bulk of fine quartz sand, and evaporated to a paste on a water-bath. When cold, the residue forms a hard mass, which is pulverized and extracted with a mixture of equal volumes of absolute alcohol and ether in a small-stoppered flask. On allowing the solution to evaporate, the glycerin is obtained free from sugar. If two drops of the glycerin are put into a test-tube with two drops of phenol (previously liquefied) and the same quantity of sulphuric acid, and heated very cautiously over a flame, but so as to reach 120°, the formation of a solid brownish-yellow mass is perceived. When cold, a little water is added and a few drops of ammonia, when the brownish-yellow solid dissolves with a splendid carmine-red color.—Chem. News, January 20th, 1882, p. 36; from Zeitschr. f. Anal. Chem., xx., No. 3.

Glycerin—Estimation in Sweet Wines.—Dr. E. Borgmann calls attention to the difficulty of correctly determining the amount of glycerin in wines which still contain much unfermented sugar. According to the method of Reichardt, as modified by Neubauer and the author, the sugar, by the treatment with lime, becomes converted into saccharate of lime, which adheres so closely to the sides of the dish that it can only be removed with great difficulty. For this reason the author proposes the following modification of Reichardt's method, when it is required to estimate the glycerin in wines containing sugar. 100 cubic centimeters of the wine are evaporated with a little quartz-sand upon the water-bath to dryness. The residual syrupy mass is then successively extracted with absolute alcohol (100 to 150 cubic centimeters, according to the amount of sugar), and the liquids subsequently mixed in a large glass flask. For 1 part of applied alcohol 1½ parts of ether are added, the mixture well shaken, and then allowed to repose until the liquid has become perfectly clear. The larger portion of the sugar will be deposited as a syrupy mass, while the entire amount of glycerin will be contained in the alcohol-ether solution. The clear solution is then poured off from the deposit, and the latter again washed with small amounts of a mixture of 1 part of alcohol and 1½ parts of ether. The combined solutions are then distilled, the residue brought into a porcelain dish with the aid of a little water, and further treated as in the case of an evaporated wine containing no sugar, according to the usual method.—Am. Jour. Phar., June, 1882, p. 284; from Zeitsch. für Analyt. Chemie, 1882, xxi., p. 239.

Glycerin—Determination.—After reviewing the different methods for the detection of glycerin, Messrs. Ed. Donath and Joseph Mayrhofer recommend the following as the best: The liquid under examination is mixed with a greater or less quantity—depending upon the amount of sugar contained in it—of delapsed lime and as much fine sea-sand, and is then evaporated to a pasty consistence upon a water-bath. When cool, the residue constitutes a hard mass, occasionally with difficulty removable from the vessel, which is pulverized and extracted in a well-stoppered vessel with 80 to 100 c.c. of a mixture of equal volumes of absolute alcohol and ether. Upon evaporation of the filtrate, the glycerin remains, perfectly free from sugar, though always somewhat yellowish, and is then best tested by the reaction of C. Reichl, which is the most sensitive and beautiful of all, and which is dependent upon the formation of glycereïn ($C_9H_{10}O_2$), discovered by that author. 2 drops of glycerin, 2 drops of (previously melted) phenol, and 2 drops of concentrated sulphuric acid are carefully heated in a test-tube to 120°, whereby a brown-yellow solid substance is formed in the resinous mass. When cool, a little water and a few drops of ammonia are added, which dissolve the brown-yellow mass with the development of a splendid carmine-red color. The presence of sugar and similar organic substances, even in small quantities, prevent the observation of this beautiful reaction, inasmuch as by the action of the sulphuric acid upon them, carbonaceous matter is formed which covers the red color of the reaction.—Schweiz. Wochenschr. f. Pharm., No. 31, 1881, p. 307.

Glycerin—A New Antiseptic Compound with Boracic Acid.—Professor Barff has applied a glacial compound—obtained by heating boracic acid and glycerin together as below—for various antiseptic purposes, and has found it to be a most efficacious compound for the preservation of meat, milk, cream, etc., the flavor of which is not in the least impaired, while the compound itself is regarded by him as quite wholesome. He uses the compound dissolved in the proportion of 1 to 20 to 1 to 60 parts of water, a solution 1 to 50 answering perfectly for meats.

The substance obtained by the action of boracic acid on glycerin is a body analogous in its composition to fats. It consists of glyceryl united with boracic acid instead of with a fatty acid. Heat 92 grams of glycerin with 62 grams of boracic acid (154 grams in all); an action takes place, and steam is given off. Heat the glycerin to a tolerably high temperature, and add the boracic acid in small quantities, with frequent stirring. At first the acid dissolves rapidly; towards the end of the operation, more slowly. If the mixture be allowed to cool directly the boracic acid is all melted, a crystalline precipitate separates out. Probably chemical combination with the glyceryl has not taken place. The weight will be found to be 131 grams, and the substance has a sweet taste. Heat a second time; a crystalline precipitate separates out on cooling, and steam is freely given off. When cold, the product will weigh 116 grams. As the chemical combination becomes more perfect, the solubility in water is increased. Heat a third time; no crystalline precipitate separates out, but the mass, when cold, sets like ice—is brittle, chips readily, and the pieces are hard and dry. The boroglyceride thus formed communicates no flavor whatever to the substances to which it is added or which are immersed in the preservative solution. In proportion as the glycerin is decomposed and chemically united with the boracic acid, the sweet principle disappears. The weight is now 100 grams, being a total loss of 54 grams, corresponding to the weight of three molecules of water ($3H_2O = 54$). The reaction is explained as follows: C_3H_5 = glyceryl, which, chemically united with 3(HO), form $C_3H_8O_3$, or glycerin; H_3BO_3 = boric hydrate. Under the influence of heat, the H_3 from the boracic acid unites with the 3(HO) of the glycerin, forming $3H_2O$, or three molecules of water, and the BO_3 of boracic acid takes their place, forming $C_3H_5BO_3$ (boroglyceride).—New Rem., June, 1882, pp. 166, 167; from Chem. and Drug.

ADDITIONAL COMPOUNDS.

Lead Glycerides.—Mr. T. Morawski traces the hardening of "glycerin putty," a mixture of oxide of lead and glycerin, to the separation of water. In addition to the *mono-plumbo-glycerin* formerly known, he has obtained a *sesqui-* and a *penta compound*, and a *plumbo-nitrato-glyceride*. The method for the determination of glycerin is not yet fully established.—Chem. News, July 1, 1882, p. 13; from Compt. Rend., No. 21, 1881.

Nitroglycerin—Preparation.—Boutmy and Foucher have recently been awarded by the French Academy of Sciences the prize of 2500 francs for their new and safe method of the preparation of nitroglycerin. The process consists in combining the glycerin with the sulphuric acid so as to form the glycerin-sulphuric acid, and decomposing the latter, slowly, by means of nitric acid. Two solutions are thus prepared: the glycerin-sulphuric acid and the sulpho-nitric acid, the latter being formed by the mixture of equal parts of sulphuric and nitric acids. These mixtures give rise to the emission of a large amount of heat, which necessitates the employment of refrigerating mixtures. In finally mixing these acids in convenient proportions, a reaction is produced which continues about twenty minutes. The nitroglycerin is deposited at the bottom of the vessel, and may be readily collected and washed. According to the old process, the reaction was rapidly accomplished, and a portion of the nitroglycerin arose to the surface, which rendered the operation of washing difficult.—Am. Jour. Phar., May, 1882, p. 225; from Jour. de Phar. d'Alsace-Lorraine, March, 1882, p. 52.

FIXED OILS.

Oleic Acid—New Process.—Mr. Charles T. George gives the following process for preparing oleic acid: Dissolve dry white Castile soap 10 pounds, in 4 gallons of hot water; add, with constant stirring, sulphuric acid 30 ounces; decant the upper layer, wash it with warm water and dissolve in it, at a moderate heat, 10 ounces of finely powdered litharge; while still warm, pour the whole into 12 pints of deodorized benzin, and after 24 hours, pour off from the deposit of lead palmitate. Shake the clear filtrate well with 4 ounces of pure hydrochloric acid diluted with 4 pints of cold water, decant and filter the benzin solution of oleic acid, evaporate in an open dish, heat over a water-bath until all odor of benzin has disappeared, wash with warm water and filter. The yield will be about 5 pounds.—Am. Jour. Phar., July, 1881, p. 379; from Proc. Pa. Phar. Assoc.

Oleates and Oleo-Palmitates—New Process of Preparation.—Dr. L. Wolff suggests that the unsatisfactory character of the oleates as usually produced has debarred their more extended use. He suggests as a remedy that definite compounds be made by double decomposition between an alkaline oleate or oleo-palmitate and a salt of the base derived in combination with the fatty acid, as has been previously recommended by him (see Proceedings, 1879, p. 429). A cheaper method, however, and one that answers quite well, is the following: One part of Castile soap (sodium oleo-palmitate) is dissolved in eight parts of water; the solution so obtained is allowed to cool and stand for 24 hours, when there will be a considerable deposit of sodium palmitate, while the supernatant liquor, containing mostly sodium oleate, is drawn off and then decomposed with a concentrated solution of a metallic salt, which, if obtainable, should contain no free acid to prevent the formation of free oleo-palmitic acid. The heavy deposit of oleo-palmitate so derived is strained off, pressed out in the strainer, and the adherent water evaporated on a water-bath; after this it is dissolved in about six or eight times its quantity of petroleum benzin, and the insoluble palmitate is left to subside while the solution of oleate decanted therefrom is filtered off. The benzin evaporated will yield an oleate that is entitled to that name, as it is a chemical combination and will remain stable and efficacious. The oleates, so prepared, present an amorphous appearance, while the palmitates are of a crystalline character. Mercury, zinc, bismuth, and lead readily combine with palmitic as well as oleic acid, and the three last-named are perhaps best dispensed in the form of oleo-palmitates, obtained by precipitating the soap solution with salts of the respective metals.

Oleo-palmitate of zinc is a pulverulent substance, imparting a greasy touch, not unlike that of powdered soapstone, and will readily dissolve in warm oils and other fats. The sulphate of the metal is used for its preparation.

Oleo-palmitate of bismuth is of an unctuous consistence, and is prepared by decomposing the solution of soap with a glycerin solution of crystallized nitrate of bismuth.

Oleo-palmitate of lead is nothing more than the lead plaster of old, but it is free from glycerin, beautifully white, and makes a more elegant and quicker litharge ointment when dissolved in olive oil. It is best prepared with the subacetate of the metal.

Oleate of mercury is prepared by precipitating the soap solution with a concentrated aqueous solution of corrosive sublimate, heating the mixture to boiling to insure its subsidence. It is then deprived of water in a water-bath, dissolved in benzin, filtered, and the filtrate evaporated.

The *oleates of iron* and of *copper* are readily obtained by the simple precipitation of the solution of the soap with the sulphate of the metals, which metals combine only with oleic acid and appear to have no affinity for palmitic acid.—Am. Jour. Phar., November, 1881, pp. 545–548.

Oleate of Mercury—Instability.—Dr. S. V. Clevenger has frequently observed the formation of a deposit of metallic mercury in originally good samples of oleate of mercury during ordinary exposure on the shop shelves, and summing up the results of numerous microscopic examinations feels warranted in claiming that:

1. In the course of time, at least, the oleate breaks up into metallic mercury in an extreme state of subdivision.
2. These minute metallic globules are suspended in the oleic acid, and a steady though slow shower of the globules fall from the liquid.
3. At all times different heights of the oil yield different percentages of mercury, the top affording the least, and the bottom the greatest quantity.
4. The freshly prepared oil will be the most uniform, an oleate a few months old containing less mercury, which accounts for the variable results obtained by physicians in its use.
5. The term "oleate of mercury" is most probably a misnomer.
6. The simplest method of making the "oleate" would be by rapid and prolonged shaking of the metal with the required amount of oleic acid, and old precipitated oleate should be thoroughly reshaken before being dispensed.—The Druggist, August, 1881, p. 177.

Palmitate of Alumina—Characters and Uses.—The combination of palmitic acid and alumina forms, according to a foreign journal, a substance resembling rosin, and presenting certain remarkable properties of value in manufactures. It melts at a higher temperature than dammar and copal resins, is easily dissolved in turpentine and benzin, and the solution possesses the consistence of a lac when it contains 5 parts of the solvent to one of the palmitate. The lac obtained in this way does not penetrate paper, never becomes brittle, but remains flexible, and dries rapidly. It acquires shortly after application a certain force of adhesiveness, which it, however, loses after drying. It possesses a beautiful silky brightness, and may be mixed with a certain quantity of dammar varnish, which communicates greater brightness, but renders it brittle. It is completely water-proof, and quite inodorous when dry.—Oil and Drug News, February 28th, 1882, p. 10.

Ricinoleate of Magnesium—Preparation.—Hager directs this to be prepared as follows: Dissolve 85 parts of carbonate of sodium in 700 parts of boiling water, and add gradually, and under stirring, 20 parts of caustic lime previously slaked and made into a milk with water. Boil until a sample of the filtrate no longer effervesces with hydrochloric acid; then strain into a glass stoppered bottle, in which the liquid is allowed to settle. Decant the clear liquid, and evaporate to 100 parts. When cold, add 100 parts of castor oil, mix and set aside in a warm place, frequently stirring, until the mixture appears to be homogeneous and begins to thicken. Then mix it with 40 parts of warm distilled water, set it aside for two hours, occasionally stirring, and having again added 100 parts of boiling distilled water, mix with a warm solution of 90 parts of sulphate of magnesium and 40 parts of chloride of sodium in 200 parts of distilled water. Stir with a spatula until the magnesium soap has been converted into a thick white mass. Then digest on the water-bath for half an hour, allow it to cool, pour off the liquid, and knead the soap so that it may be deprived of adhering liquid as much as possible. Dry the soap, powder it, and preserve it in well-stoppered bottles. The yield is about 100 parts. This magnesia castor-oil soap is given in doses of 5, 10 or 15 grams, and is best administered mixed with sugar in coffee.—Paint, Oil and Drug News, August 3d, 1881, p. 206; from New Rem.

Chlorinated Oil—Preparation, Characters, and Uses.—The use of chlorine gas, in aqueous solution, in chronic affections of the skin, while quite effective, has some disadvantages, which Dr. L. Wolff has sought to overcome by the use of fixed oil as solvent. In this he succeeded, though he found that the fat was capable of absorbing a very much larger quantity of the chlorine, and that, in fact, it produced an interesting chlorinated compound. To prepare it dry chlorine gas, generated in the usual way, is passed into the oil until it ceases to be absorbed, which appears to take quite a long time. The oil so treated showed at first but little change, save that of turbidity, which could not be due to water being present, as the gas had been well dried. It soon warmed and heated, and vapors of hydrochloric acid were then evolved. It had changed its color but little, grew viscid and of the sp. gr. of 1.059. It is insoluble in alcohol. The product was purified by washing with water, solution in benzin, filtering and evaporating. It is then neutral to test-paper, but soon grows turbid and forms hydrochloric acid, thus proving the loosely molecular combination of the chlorine. It possesses no marked odor, and certainly not that of chlorine, and varied in taste but little from that of ordinary oils, no irritant action being manifested when applied to the tissues. By reason of the large quantity of chlorine this compound contains (by computation of its atomic weight the author determined it to contain 17.9 per cent. Cl), and the loosely molecular condition in which it exists, it will readily form chlorine compounds with bodies of stronger affinity, and as such will prove probably of great therapeutic value wherever the use of chlorine as a disinfectant or parasiticide is indicated. The author accompanies his paper by an elaborate explanation of the chemical theories involved in its production and composition, and gives the following formula for the chlorinated oil: $C_3H_53(C_3O_2H_2—C_{15}H_{29}Cl_2)$.—Amer. Jour. Phar., June, 1882, pp. 273–278.

Wax, Ceresin, etc.—Specific Gravity.—E. Dieterich observes that white and yellow wax are now generally adulterated with white and yellow ceresin respectively, instead of, as formerly, with tallow, paraffin, colophonium, etc. He has determined the specific gravity of wax, and some of its adulterants, as well as of mixtures of wax and ceresin, as follows:

Cera alba,	0.973
Cera japonica,	0.975
Ceresin, half white,	0.920
Ozokerite, crude,	0.952
Colophonium, American,	1.108
Oleum cacao filtratum,	0.980–0.981
Resina pini depurata,	1.045
Sebum bovinum,	0.952–0.953
Cera flava,	0.963–0.964
Ceresin, white,	0.918
Ceresin, yellow,	0.922
Cetaceum,	0.960
Colophonium, Gallic,	1.104–1.105
Paraffin, med. hard,	0.913–0.914
Stearin, A No. 1,	0.971–0.972
Sebum ovillum,	0.961

Mixtures.

a. Yellow Wax.

Yellow Wax, sp. gr. 0.963.	Yellow Ceresin, sp. gr. 0.922.	Sp. gr. of Mixtures.
80 parts.	20 parts.	0.957–0.958
60 "	40 "	0.950
40 "	60 "	0.937
20 "	80 "	0.931

b. White Wax.

White Wax, sp. gr. 0.973.	White Ceresin, sp. gr. 0.918.	Sp. gr. of Mixtures.
80 parts.	20 parts.	0.962
60 "	40 "	0.951
40 "	60 "	0.938
20 "	80 "	0.932

Egyptian wax, which is now frequently found in European commerce, is distinguished from the German article by its deep color and absence of pleasant odor. Its specific gravity is rarely below 0.965. —Arch. d. Pharm., June, 1882, p. 455.

Wax—Detection of Ceresin and Paraffin.—Peltz recommends that 1 to 2 grams of the suspected wax are boiled for several minutes in a solution of 1 part of caustic potassa and 3 parts of alcohol of 90°; the liquid is poured into a test-tube, which is allowed to remain one-half hour in boiling water to prevent it from congealing. If the wax is pure, the liquid remains clear, whilst paraffin and ceresin are evidenced by the formation of an oily layer upon the surface of the alkaline solution, and may be determined on cooling.—Arch. d. Pharm., June, 1882, p. 471; from Jour. de Pharm. et de Chim. (5), vol. v., p. 154.

Vegetable and Animal Fats—Determination of Free Acids.—F. Strohman finds that the method of Burstyn, to shake the fat with alcohol for the removal of free acids, is unreliable, because their complete extraction by this means is impossible. The method of Hoffman, which consists in titrating the ethereal solution of the fat with an alcoholic solution of soda, is quite reliable, but inconvenient on account of the instability of the soda solution. He, therefore, recommends the following method: About 10 grams of the oil are well shaken with 100 c.c. of alcohol of 96° in a small flask; firm fats are first dissolved in a little ether. A few drops of neutralized rosolic acid are added, and the mixture is titrated with baryta-water until it assumes a red color. Upon vigorous agitation the color is again dissipated, and the alcohol takes up a fresh quantity of acid. The titration with baryta-water is continued, until, after vigorous agitation, a permanent red color remains.—Arch. d. Pharm., March, 1882, p. 228; from Jour. Pract. Chem., 24, p. 506.

Olive Oil—Detection of Adulterants.—The manager of the Marseilles public laboratory gives the following methods for detecting adulteration in olive oil with other oils: Beet-root oil contains sulphur, and saponifying the oil with an alcoholic solution of caustic potassa will bring out the sulphurous acid. Sesame oil can be found by adding a little muriatic acid to a small piece of sugar, and, shaking these with some of the oil, the sesame oil will be recognized by its red color. Cotton-seed oil has to be treated with nitric acid, and on shaking, a coffee-brown color will be seen.—Chem. and Drug., December, 1881, p. 528; from Analyst.

Cotton-seed Oil—Characters.—Mr. Edmund Scheibe has examined a sample of purified cotton-seed oil, and finds that it is well suited as a substitute for olive oil in many of its applications. The sample was clear, transparent, and golden-yellow at the ordinary temperature; it had a bland taste, and was odorless. The specific gravity at 17° C. = 0.9230, which corresponded well with that given by Bolley for the refined yellow oil, while the specific gravity for the colorless cotton-seed oil is given much higher (0.9288). Cotton-seed oil belongs to the non-drying oils, but the distinction from the drying oils by the elaidin-test is not very sharp. On the other hand the rise of temperature upon the addition of 1 part of sulphuric acid to 5 parts of oil was 45° C., approaching in this respect olive oil, for which a rise of 38°–40° is given. Drying oils would, under the same conditions, cause a rise of from 60°–70°. The congealing-point of cotton-seed oil is below 0° C., and the solidification is more homogeneous and rapid than in the case of olive oil, which constitutes a distinction of some importance. Other points of distinction of the two oils are the following: 1. The elaidin-test, which occurs in the case of cotton-seed oil only incompletely, and is accompanied by considerable browning of the oil. 2. The specific gravity, which, in the case of olive oil, is considerably lower, being 0.912.—Schweiz. Wochenschr. f. Pharm., No. 47, 1881, p. 457; from Pharm. Zeitschr. f. Russl., and Chem. Centralbl.

Cotton-seed Oil—Presence of a Yellow Unsaponifiable Body.—Cotton-seed oil contains a yellow unsaponifiable oily body, and its admixture with olive oil may, according to Roediger, be detected by saponifying the oil and treating the nearly dry soap with benzin, on the evaporation of which, golden-yellow drops are left behind. This yellow oil causes the ugly yellow spots in soaps made with cotton-seed oil.—Am. Jour. Pharm., April, 1882, p. 178; from Chem. Zeitung, 1881, p. 623.

Croton Oil—Preparation and Solubility in Alcohol.—L. Julliard has made a series of experiments relative to the solubility of croton oil in alcohol, and has arrived at the conclusion that very little of it is dissolved by that liquid. The greater or less solubility of commercial croton oil, which is almost exclusively produced in India, he believes to be due to its adulteration with castor oil. He considers this to be so universal a practice that it is best to prepare the oil for oneself rather than to trust the commercial article, and gives the following method for its preparation:

The *Croton Tiglium* seeds (it matters little whether they are fresh or not) are thrown into a porcelain dish, covered with water, and well stirred with a stick; the water is poured off and the operation is repeated. The seeds are thoroughly dried in a cloth and ground to a coarse powder, care being taken to separate those which are hollow (? Rep.), the latter description of seeds being generally in the majority. A certain weight of this powder, say 50 grams, is treated with double its weight of pure ether or carbon disulphide in a funnel plugged with a pledget of cotton-wool, passing the filtrate a second time through the powdered mass. The resulting liquid is then evaporated either spontaneously, or at a very gentle heat. The yield is from 30 to 32 per cent. of the dry powder. It is very active, and should be kept in small bottles covered with bladder to prevent loss.—Chem. Jour., January 27th, 1882, p. 46; from Jour. de Pharm. et de Chim., and L'Union Pharm.

Fixed Oil of Thevetia Nereifolia—Characters, etc.—See *Thevetia Nereifolia*, under "Materia Medica."

CARBOHYDRATES.

Carbohydrates—Combinations with Alkalies.—Messrs. Th. Pfeiffer and B. Tollens have examined successively the combinations of the alkalies with starch, with cane sugar, with amylo-dextrin, with dextrin, and with inulin. They conclude that the molecular magnitude of the substance of the starch series may be determined by the aid of the alkaline compounds of these carbohydrates. *Starch* may be considered as $C_{24}H_{40}O_{20}$, including four starch groups $C_6H_{10}O_5$. The formula of *cane-sugar*, $C_{12}H_{22}O_{11}$, is confirmed. *Inulin* requires a formula with 12 atoms of carbon, and cannot therefore be placed parallel with starch. The molecular magnitude of *dextrin* is much smaller than that of starch, and approaches more that of the sugars and of inulin. *Amylo-dextrin sodium* prepared from crude amylo-dextrin has given figures which approximate to those of the corresponding starch compounds. Amylo-dextrin, obtained by freezing, precipitation, etc., gives figures agreeing more or less with those of dextrin, inulin, and cane-sugar. —Chem. News, February 17th, 1882, p. 78; from Annal. d. Chem., vol. 210. No. 2 and 3.

Cellulose from Fungi—Identity with the Ordinary.—The view that the cellulose of fungi is distinct from the ordinary because it fails to give the blue color with chloriodide of zinc, is, according to Richter, erroneous. The failure of the reaction is due to the presence of a foreign body, which may be removed by treatment with alkali for a long time (occasionally 6 weeks). In the case of *Dædalea* this foreign substance is suberin; in that of *Agaricus campestris* an albuminoid body.—Arch. d. Pharm., January, 1882, p. 57; from Sitzungsber. d. Wien. Akad., 1881.

Hydrocellulose—Characters.—Mr. Aimé Girard has established some years ago (see Proceedings, 1876, p. 307) that cellosic matter, in whatever form, if submitted to the action of acids under determined conditions, passes before saccharification into an intermediate state of hydration, in which state he has named it hydrocellulose. The cellulose then loses its normal cohesion, and becomes absolutely brittle. It retains, however, the chemical properties of normal cellulose, and especially that of forming nitro-compounds, which are especially friable. If such nitro-compounds are prepared with cold and concentrated acids they are explosive; with hot and dilute acids they are soluble in mixtures of alcohol and ether, and are suitable for the manufacture of photographic collodion. Chem. News, October 28th, 1881, p. 216; from Bull. de la Soc. Encouragement pour l'Industrie Nationale (3), vol. viii., No. 91.

Starch—Modification.—F. Musculus states that starch may be crystalline or colloid; when colloid it is soluble in water, is colored blue by iodine, does not diffuse, and is easily attacked by ferments and acids; it is readily converted by hot water into an insoluble condition, which is not attacked by acids and ferments, and is colored red or yellow by iodine. After treatment with strong acids or soda it is reconverted into the first form. Crystalline starch is soluble in water up to 60°, diffuses and ferments; the separate crystals are not colored by iodine, but the solution is colored red and becomes blue on evaporation.—Journ. Chem. Soc., October, 1881, p. 888; from Bieder. Centr., 1881, p. 355.

Starch—Supposed Conversion into Sugar by Water at High Temperature.—F. Soxhlet finds that starch subjected to the action of water under high pressure at 149° is to a certain extent converted into sugar, but as the proportion of water increases the amount of sugar formed decreases; this is not the case if an acid (lactic acid) is present. The reason is to be found in the fact that there is present in potato and wheat starch a free acid (due to the process of manufacture), which when diluted with water is less energetic in its converting power. The amount of this acid in various samples has been determined. Rice and maize starch are alkaline. Neutral starch is not converted into sugar by water under high pressure or temperature. —Journ. Chem. Soc., January, 1882, p. 30; from Bied. Centr., 1881, pp. 554–557.

Erythrodextrin—Character.—This substance is, according to Musculus and Nägeli, a soluble starch, which gives with iodine not a blue but a red reaction, and is possibly a mixture of achroodextrin and soluble starch. F. Musculus and A. Meyer have now obtained the intense red color which characterizes erythrodextrin, when a half per cent. solution of soluble starch was added to a solution of a higher dextrin, which gave a pure yellow brown reaction with iodine.—Jour. Chem. Soc., 1881, p. 570; from Zeits. f. Physiol. Chem.

Natural Vegetable Gums—Tests.—C. Reichl and F. Breinl give the following test for arabin and bassorin, as distinguished from dextrin or artificial gum. The former two, when heated with hydrochloric acid and orcin, give a blue flocculent mass, which with alcoholic potash yields a violet solution, fluorescing green. This reaction is shown by wood-gum so easily that even fragments of wood, which contain traces only of gum, when boiled with orcin and hydrochloric acid, show the reaction quite distinctly.—Amer. Jour. Pharm., May, 1882, p. 218; from Chem. Industrie, February, 1882, p. 51.

Viscose—A Gummy Substance from Sugar.—According to A. Bechamp, viscose, the gummy substance formed by the viscous fermentation of cane-sugar, forms, when dry, a white friable substance of the same composition as starch, soluble in water in the cold, forming a gummy solution, from which it is precipitated by alcohol. The solution does not reduce Fehling's solution, and gives no blue color with iodine. Its rotatory power varies with the temperature, being + 223.7 at 21°, 222.7 at 24°, and 219.8 at 38°. These values are somewhat near that for soluble potato-starch. It yields two derivatives with nitric acid. When boiled with dilute sulphuric acid it is converted into glucose and dextrins, the latter varying in their degree of solubility in alcohol and in their rotatory power. The glucose appears to be identical with that from potato-starch. During viscous fermentation alcohol and acetic acid, and in some cases lactic acid, are formed in small quantity. Neither inverted sugar, glucose from potato-starch, nor lævorotatory sugar undergo viscous fermentation, but under the same conditions yield mannitol.—Jour. Chem. Soc., November, 1881, p. 1024; from Compt. Rend., pp. 93, 78–81.

Lævulan—A New Gum.—E. von Lippmann has discovered a new gum in the molasses of beet-root sugar, which, being the anhydride of lævulose, he has named "lævulan." It is an amorphous, snow-white body, having the composition $C_6H_{10}O_5$. When it is precipitated by alcohol from its neutral solution in lime-water, it is in a hydrated condition, and readily soluble in cold or hot water, forming a colorless, neutral, and tasteless solution. By treatment with absolute alcohol it becomes anhydrous. It is only soluble in hot water, and forms a solution which, on cooling, constitutes a consistent jelly, having strong adhesive qualities. By continued boiling this is again converted into the soluble (hydrated) lævulan. It is left-rotatory. By the action of dilute sulphuric acid and heat it is converted into lævulose.—Archiv d. Pharm., September, 1881, p. 215; from Ber. d. d. Chem. Ges., 14, p. 1509.

Galactin—A New Carbohydrate from Leguminous Seeds.—A. Muntz has extracted from leguminous seeds a substance to which the name of galactin is applied, and which is considered as a definite chemical principle. It is obtained by treating powdered lucerne seeds with water, containing a little neutral acetate of lead. To the liquid thus obtained a slight excess of oxalic acid is added, which precipitates the lead and the lime, after which to the clear liquid one and a half times its volume of 92 per cent. alcohol is added. A white mass is thus obtained, which remains attached to the rod with which the liquid is stirred. The mass is expressed, washed with water containing a considerable amount of alcohol, then redissolved in water and precipitated a second time by alcohol.

When thus prepared and dried by exposure to the air, it presents the form of white, translucent nodules, containing a small quantity of mineral matter. It swells in water, then dissolves slowly, similarly to gum arabic. The solution is viscid, but limpid; it is not precipitated by the neutral, but by basic acetate of lead, and shows the same deportment to metallic compounds as gum arabic. Its composition is that of the latter, $C_6H_{10}O_5$; it is dextrogyrate, and its rotatory power with sodium light is + 84.6°. When treated with nitric acid it yields a large amount of mucic acid. When treated at the temperature of 100° C., with dilute mineral acids, it is slowly transformed into saccharine matters, which, when brought to the consistence of a syrup, yield hard, brilliant crystals, readily obtained pure by repeated crystallization from alcohol; there then remains also an uncrystallizable sugar. The crystals are but sparingly soluble in cold alcohol, but dissolve in boiling alcohol, from which they are deposited in the form of a crystalline crust. Their taste is slightly saccharine; but they are very different from arabinose, a sugar which is generally obtained by treating gum with dilute acids. In all their properties they approach more closely to the *a* galactose of Fudakowsky, which is obtained by the decomposition of sugar of milk. A comparision with galactose has confirmed the identity of the two products, they having the same rotatory power and the same melting-point, 161° C., while the melting-point of arabinose is 143° C.

The gum of the seed of lucerne is thus a distinct substance, and in consequence of yielding the same products of decomposition as sugar of milk by the action of dilute acids, the name *galactin* is applied. It is abundant in vegetable products, in the seeds of the leguminosæ, and particularly in those which contain no starch. It appears to be localized in the testa, of which that of the seed of lucerne contains 42 parts by weight in 100. It is digested by animals, but cannot be saccharified, however, by the saliva or by the pancreatic juice. From the remarkable property of this body in yielding galactose, the author thinks it possible that it may form a portion of the material from which the herbivorous females derive the elements of sugar of milk secreted by their organs of lactation, and the origin of which is still enveloped in mystery. The sugar of milk is of rare occurrence in the vegetable kingdom, and has been found with certitude only in the juice of the sapodilla.

The very extended distribution in the vegetable kingdom of the above-described substance, which is employed in alimentation, shows that the elements of sugar of milk are at the abundant disposition of herbivorous animals.—Amer. Jour Pharm., June, 1882, pp. 289; from Rép. de Pharm., 1882, No. 3, pp. 107–109.

Inosite—Preparation and Characters.—Tanret and Villiers have investigated the properties of inosite extracted from walnut leaves. It is prepared as follows: The coarsely powdered leaves are treated with twice their weight of milk of lime, allowed to stand several hours, the mixture diluted with cold water and treated with an excess of crystallized acetate of lead. After filtering, ammonia is added as long as a precipitate forms. The precipitate is collected and treated with a slight excess of dilute sulphuric acid, and after removing the sulphate of lead, the remaining acid is neutralized with baryta-water, and the filtrate, after evaporation to a syrup, is poured into from ten to fifteen times its weight of 95 per cent. alcohol. The viscous precipitate which is thrown down is obtained perfectly white after several crystallizations from water. The maximum yield—3 grams from 1 kilogram of dried leaves—appears to be gained from leaves gathered in August. Leaves gathered in June yielded only 1 gram per kilogram dry substance. Very young or old leaves do not appear to contain any. Whenever found it appears to be accompanied by a reducing sugar: in animal matter, by glucose; in walnut leaves (and in green baricot beans), by a fermentable and reducing saccharine body.

Inosite forms clinorhombic prisms, of the composition $C_{12}H_{12}O_6 + 2H_2O$, which effloresce in the air. The authors show, by means of a table, that the crystals of inosite, obtained from various sources, are crystallographically identical. The specific gravity of the hydrated crystals is 1.524 at 15° C. 1 part of inosite is soluble in 10 parts of water. When boiled with Fehling's solution, the latter at first becomes green, but remains clear. Prolonged boiling gives rise to a green precipitate, which dissolves on cooling, and if the boiling is continued for a long time red cuprous oxide is formed. By the action of nitric acid it is converted into an acid substance, which gives a rose coloration with calcium, barium, and mercury salts. Upon this property Scherer's test for inosite is based, which is best applied as follows: The substance is evaporated almost to dryness with nitric acid in a platinum crucible, a drop of dilute chloride of calcium is added, and the mixture again evaporated. If inosite is present, a rose coloration is observed, especially on adding ammonia.—Jour. Chem. Soc., November, 1881, p. 1022; from Ann. Chim. Phys. (5), 23, pp. 389–397.

Cane sugar—Oxidation Products.—Mr. C. Heyer contributes a very lengthy paper, in which he describes in detail an extensive series of experiments made to determine the influence of oxidizing agents upon cane-sugar. These experiments prove that by the action of permanganate of potassium upon cane-sugar, as well as by that of chromic acid, carbonic, oxalic, and formic acids are formed. Oxalic acid, however, is only produced when the permanganate acts upon the sugar in very dilute solution, and at the ordinary temperature. If the oxidizing action of the permanganate is increased by the addition of sulphuric acid, only carbonic and formic acids are formed, and if a sufficient quantity of the permanganate is present, it is possible to oxidize the sugar completely, as is the case with chromic acid, into carbonic acid and water.—Arch. d. Pharm., May and June, 1882, pp. 336–350, and 430–450.

Sugar—Purification of Beet root Juice.—According to an authority in "Dingler's Polyt. Jour.," 241, pp. 40–48, at the Gandersheim sugar refinery the juice is treated in the "first saturation" with 1.8 per cent. lime, calculated on the original beet-root, and carbonic acid is introduced until the juice shows 0.15 per cent. of alkalinity. The mass is passed through filter presses, and the clear liquid treated in the "second saturation" with 0.18 per cent. of lime, and carbonic acid again introduced until 0.08 per cent. alkalinity has been obtained. The mass is again filter-pressed, and the clear juice treated in the "third saturation" with sulphurous acid. The alkalinity is reduced to 0.03 per cent., and the whole thrown on filters filled with gravel. The thin juice is evaporated, filtered, and finally boiled down in vacuum pans. At the Onzie sugar works an inferior beet-root is worked up. The juice is treated with more lime at a temperature of 69°, and the whole heated to 85°. The carbonic acid is pumped into a receiver, whence it is introduced into the saturation-vessel. Thus it is possible, in spite of more lime being used, to complete the saturation in a short time, as a uniform stream of carbonic acid at any desired pressure can be obtained. The clear portion of the juice is treated with phosphoric acid, which removes part of the calcium salts without materially altering the alkalinity. The mass is then filtered. The addition of phosphoric acid has the advantage of separating arabin, a substance having considerable influence on the formation of molasses.—Jour. Chem. Soc., October, 1881, p. 951.

Sugar—Cheap and Rapid Process for its Separation from Treacle.—Dr. Jüneman obtains a saccharate of lime by treatment with caustic lime, water, and steam, at 8 atmospheres; frees the compound thus obtained from mother-liquor by pressure and by washing at a high tension, and when brought to 99.3 decomposes it. Dr. Scheibler doubts the value of the process, as the temperature employed (172° C.) destroys sugar, especially in presence of lime.—Chem. News, July 15th, 1881, p. 37; from Biederm. Centralbl., ix., No. 9.

Strontium Saccharate—Preparation in the Working of Molasses and Sugar.—C. Scheibler has patented a process for the extraction of sugar from beet-root molasses by the aid of strontium salts, which are now found so abundantly in Germany. At a boiling temperature, either with or without the aid of pressure, tribasic strontium saccharate is precipitated, is separated from the liquid at the same temperature, and washed with hot water. This strontium saccharate is decomposed by water at a lower temperature into a less basic saccharate and free strontium hydrate. The former can then be used again in the separation of sugar from fresh portions of juice. This strontium process is to be used as a substitute for the "elution" process with calcium saccharate.—Am. Jour. Pharm., February, 1882, p. 69; from Chem. Industrie, October, 1881, p. 302.

Sugar—Action of Cupric-hydroxide.—J. Habermann and M. Hönig find that the pure hydroxide of copper, boiled with aqueous solution of levulose, dextrose, inverted sugar, and cane-sugar, is reduced to cuprous oxide. With levulose, dextrose, and inverted sugar, the reaction begins at once with ebullition, and goes on rapidly with levulose and inverted sugar, but more slowly with dextrose. With cane-sugar the change sets in after several hours' boiling, *i. e.*, probably after the cane-sugar has been inverted. The following oxidation products were observed in all the above-mentioned sugars: Carbonic, formic, and glycolic acids, and an amorphous residue, not yet fully examined. If hydroxide of barium is allowed to act along with cupric hydroxide the same acids are formed, but the process is more rapid. Cupric hydroxide acts upon milk-sugar in the same manner, but the decomposition products have not been further examined.—Chem. News, June 30th, 1882, p. 288; from Zeitschr. f. Anal. Chem, xx., No. 4.

Sugar—Determination with Fehling's Liquid.—Mr. E. Boiret proposes the following method for ascertaining if the reduction of the copper is complete: Two fragments of white filter-paper are placed upon each other, and upon the upper fragment a drop of the boiling mixture of Fehling's liquid and the saccharine solution is placed. The paper acts as a filter, and only the copper solution arrives on the lower paper, the reduced cuprous oxide remaining on the upper. A drop of dilute solution of ferrocyanide of potassium is now placed upon the filtered drop on the lower paper, which is dried over a spirit-lamp. If there is an appreciable quantity of copper the spot, on drying, is surrounded with a rose-colored halo. If there is a mere trace, the characteristic rose tint appears on moistening the spot with a drop of acetic acid; but if the copper is entirely reduced, heat and the application of acetic acid produce a blue spot, due to the decomposition of the ferrocyanide.—Chem. News, May 19th, 1882, p. 221; from Jour. de Pharm. et de Chim., April, 1882.

Glucose (So-called)—Manufacture.—Professor Harvey W. Wiley has contributed an interesting paper on glucose and grape-sugar, its manufacture, uses, etc., in "Popular Science Monthly," from which the following is culled: In 1880 ten glucose factories were in operation, consuming daily about 20,000 bushels of corn. There were at that time nine more factories, with a total capacity of 22,000 bushels, in construction, so that at the present time (*i. e.* 1881), if only half of these factories are in running order, there must be a daily consumption of not far from 35.000 bushels of corn for sugar and syrup making. From the best information obtained the cost of converting corn into glucose and grape-sugar is about one cent a pound. A bushel of corn (costing in 1880 in the neighborhood of 30 cents) will yield from 26 to 32 pounds of glucose, which is sold by the manufacturers at three to four cents per pound. A very large percentage of the glucose is used for the manufacture of table syrup; but it is used besides for candies, as food for bees, for brewing, and for artificial honey; to some extent also by vinegar-makers, tobacconists, wine-makers, distillers, mucilage-makers, and perhaps for some other purposes. Grape-sugar, which is also used for many of the purposes enumerated, is used chiefly for the adulteration of other sugars. The author gives the following outline of the method of manufacture: The corn is first soaked for two or three days in warm water, and is then ground on specially prepared stones with a stream of water. The meal is next passed into a trough, the bottom of which is made of fine bolting-cloth. Here the starch is washed through, and led to large tanks, where it is allowed to settle. It is next beaten up with caustic soda to separate the gluten, and the starch is again allowed to settle in long, shallow troughs. The starch, washed from all adhering alkali, is next beaten up with water into a cream, and conducted into the converting-tubs. These tubs are supplied with coils of copper steam-piping and are made of wood. Here the starch-cream is treated with dilute sulphuric acid, and steam is allowed to bubble up through the mixture from small holes in the copper pipes. This process of conversion, which is called "open conversion," is completed in about two hours.

Another method is called "close conversion." The substances are inclosed in stout copper cylinders, and subjected to the action of superheated steam. This process occupies about fifteen minutes.

The conversion is also accomplished sometimes by fermentation. This requires a much longer time. The greater part of it, however, is carried on by the method first named.

After conversion the acid is neutralized by marble-dust and animal charcoal. Since the sulphate of calcium, which is formed in this operation, is slightly soluble in water, carbonate of barium has been used instead of marble-dust. Its use, however, has not become general.

After neutralization the liquid is filtered through cloth and animal charcoal, and is then conveyed to the vacuum-pan. Here it is evaporated, at as low a temperature as possible, to the required concentration. If grape-sugar is to be made, the process of conversion is not stopped as soon as the starch has disappeared, but is carried on still further to a point which can only be determined by trial. After concentration it is conveyed into tanks, where the process of solidification begins and continues for several days.

Glucose, on the other hand, will not harden, whatever the degree of concentration may be, or, at least, if it do so, only partially and after many months.

The habit of bleaching both glucose and grape-sugar by means of sulphurous acid is sometimes practiced, but is reprehensible. By the oxidation of the sulphurous acid, free sulphuric acid is likely to occur in the finished product.

There is no reason to believe that a glucose or grape-sugar properly manufactured is any less wholesome than cane- or maple-sugar. Corn, the new American king, now supplies us with bread, meat, and sugar, which we need, as well as with the whiskey, which we could do without.—New Rem., August, 1882, pp. 228–230.

Glucose—Preparation from Cassava.—The "Confectioner's Journal" states that a company for the manufacture of glucose from cassava is contemplated at an early day, and that this plant seems destined to take a prominent part in the development of the confectioner's trade. The amount of glucose produced from one bushel of corn is 30 pounds, or 1050 pounds from one acre. Well-authenticated evidence is at hand to the effect that twenty tons of cassava to the acre is no unusual crop in Florida. This would at 56 pounds to the bushel, give a yield of over 700 bushels per acre, and, at the rate of 30 pounds of glucose per bushel, would produce over 21,000 pounds of glucose per acre. A comparison of the yield of glucose from corn and cassava from a large area is as follows: 1000 acres of corn yield about 500 tons of glucose; 1000 acres of cassava yield about 10,000 tons of glucose.

The method of cultivation is generally as follows: The ground is prepared as for planting corn, the seed (which consists of a section of the stalk containing an eye) is set in the sandy soil, spaced about two feet, in rows three feet apart. When about eighteen inches high, the field is cultivated, in order to raise the soil about the base of the stalk, which affords a better support to the plant.

The leaves of the branching top shade the ground, and prevent the formation of weeds and evaporation of surface-moisture. No irrigation is required, as the moisture is continually supplied to the tubers by capillary attraction. The tubers grow somewhat similar to the sweet-potato, radiating from the base of the plant, and lying generally horizontal. They may be utilized in about six months after planting, and will continue to grow without deterioration for a period of two years and upwards, developing to such an extent that tubers weighing from sixty to eighty pounds have frequently been taken from the soil. The harvesting of the crop is very simple. The stalk is raised, and tubers extracted, by simply pulling them from the loose soil. The plant may be again inserted, when it will produce new roots. The earth in this case is the storehouse from which the supply is extracted, as required, with the advantage of the crop increasing in value as long as it remains therein, whereas, in corn, there is a season for harvesting, storing, handling, and rehandling before it comes to the hands of the manufacturer.

Cassava may be removed from the ground any day in the 365, and carried to the mill for direct treatment. For many years the root has been raised in Florida, and used for many purposes. The plants are natives of South America. The roots (tubers) may be preserved for food purposes, by being simply cleaned, sliced and dried; from such dried slices, manioc or cassava meal, used for cassava bread, etc., is prepared by simply grating. The starch is separated and prepared for food under the name of Brazilian arrowroot; and this when agglomerated together into pellets on hot plates, forms the tapioca of commerce.

The glucose made of cassava is of fine body and flavor.—New Rem., June, 1882, p. 184.

Grape-sugar—Formation of Anhydrous Crystals from Aqueous Solutions.—Mr. Arno Behr, reasoning from the fact that the introduction of ready-formed crystals into solutions previously brought to the crystallizing-point often accelerates the process of crystallization, was induced to try the effect of adding some crystals of anhydrous grape-sugar to a concentrated solution of the hydrate, hardly expecting much result, but rather supposing that the anhydride would become converted into the hydrate. This was, however, not the case, for after standing a night, a large crop of crystals of anhydrous grape-sugar was found to have been formed. Further research showed that the introduction of ready-formed crystals is not absolutely necessary, provided that the solutions are sufficiently concentrated and the temperature of the surrounding air warm enough. The purer the solution the more quickly is crystallization effected. The proper temperature of the air was found to be 30° to 35° C., or the same as that at which the after-products from the refining of cane-sugar are crystallized out. The addition of some previously formed crystals in the state of powder to the solution is advisable to insure the formation of a perfectly homogeneous mass; only a very small quantity, however, is required. As in the preparation of loaf-sugar, the crystalline mass is freed from adhering mother liquor in a centrifugal machine. The author further states that grape-sugar thus made resembles cane-sugar in many of its properties, and might for a number of purposes be used as a substitute for the latter. As regards sweetness, it stands in relation to cane-sugar in the proportion of 1 to $1\frac{2}{3}$.—Chem. and Drug., June, 1882, p. 250; from Ber. d. Deutsch. Chem. Gesell., May 22, 1882.

Glucose—Conversion into Dextrin.—F. Musculus and A. Meyer have found that, on adding to 20 grams of glucose 30 grams of sulphuric acid, stirring the mixture constantly, heating it at 60° until it becomes brown, and then throwing it into 800 grams of absolute alcohol, there is formed, in about a week, a thick precipitate, consisting of a white hygroscopic powder of the composition $C_{18}H_{28}O_{14}.C_2H_6O$. On boiling with water the alcohol is eliminated, and water substituted. A yellow amorphous mass is thus obtained, having all the properties of dextrin. It is not fermented by yeast or converted into sugar by diastase. After boiling some time with acidulated water (four per cent. H_2SO_4), it is converted into glucose. Its diffusibility as tested by dialysis is less than that of the sugars, but greater than that of the natural dextrins.—Jour. Chem. Soc., July, 1881, p. 570; from Bull. Soc. Chim.

Glucose—Reducing Power for Fehling's Solution.—According to P. Degener, from solutions of basic tartrate of copper and sodium, containing for every three atoms of copper less than four molecules of free alkali, and from 16 to 18 molecules of Rochelle salt, grape-sugar after thirty minutes' boiling precipitates varying quantities of cuprous oxide, which is always contaminated with organic substances. When the amount of alkali is raised to 4 molecules per three atoms copper, tolerably exact results are obtained, which may be made quite accurate by employing 6 molecules alkali. The cuprous oxide is then thrown down more rapidly, and is free from organic matter. Further addition of alkali does not appear to affect the result up to a certain point. The author is at present engaged in determining other influences on the reaction. It can, however, be affirmed that by using the above solution with more than 4 molecules free alkali to 3 atoms of copper 1 molecule of grape-sugar will always reduce 6 molecules of copper, and not as in the case of Fehling's numbers, from 5.25 to 5.67.—Jour. Chem. Soc., January, 1882, p. 104; from Chem. Cents., 1881, p. 470.

Glucose—Modified Test.—Boettger's test (bismuth subnitrate and sodium carbonate) is modified by L. Dudley as follows: the bismuth salt is dissolved in as little pure nitric acid as possible, the solution mixed with an equal volume of acetic acid and diluted with 8 or 10 volumes of water. The solution keeps well, may be still further diluted without becoming turbid, and is used by adding 1 or 2 drops of it to the urine, rendered strongly alkaline by soda, and by boiling the mixture for 20 or 30 seconds; in the presence of sugar the white precipitate will acquire a gray or black color.—Am. Jour. Pharm., November, 1881, p. 575; from Zeitschr. Anal. Chem., xx., 117.

Starch-Sugar—Detection in Cane-Sugar.—P. Casamajor observed that methyl alcohol of 50° by Gay-Lussac's alcoholometer, if saturated with starch-sugar, will dissolve cane-sugar, either white or yellow, very readily from mixtures of cane- and starch-sugar, without dissolving the latter. The degree of approximation in determining the latter has not yet been ascertained.—Am. Jour. Phar., February, 1882, p. 60; from Chem. News, xlii., 326.

Starch-Sugar—Detection in Sugar-house Molasses.—P. Casamajor observed that straight sugar-house syrup, when mixed with three times its volume of methylic alcohol, will dissolve by stirring, giving a very slight turbidity, which remains suspended, while syrups containing an admixture of starch sugar give a very turbid liquid, which separates when left at rest into two layers, the lower being a thick viscous deposit containing the glucose syrup.

Considerable quantities are sold of a thin syrup of about 32° B., in which the proportion of sugar to the impurities is greater than in common sugar-house molasses. When a syrup of this kind is stirred with three times its volume of methylic alcohol a marked turbidity and deposition will take place, which consists of pure sugar. The crystals are hard and gritty, and adhere to the sides of the glass, and are deposited on the bottom. There is no resemblance between this precipitate and that due to starch-sugar syrup.

Straight sugar house syrup of about 40° B. will not dissolve in three times its volume of 93½ per cent. ethylic alcohol.—Am. Jour. Phar., February, 1882, p. 60; from Chem. News, December 2, 1881, p. 265.

Potato-Sugar—Injurious Qualities.—Professors Kedzie, Nessler, Barth, Fleck, and Schmitz, find that potato-sugar contains impurities of sulphuric acid, sulphate of iron, and lime, but that its most dangerous ingredient is a bitter matter remaining after the sugar has passed into fermentation, which occasions cold sweats, oppression on the chest, headaches, etc. The use of potato-sugar in the manufacture (gallizing) of wine and in brewing becomes a matter of questionable permissibility.—Chem. News, October 14, 1881, p. 192; from Biederm. Centralbl., x., No. 1.

Maltose—Characters.—Dr. E. Meisel states that when maltose is boiled with dilute acids, it is converted into a sugar having greater reduction power, *i. e.* dextrose. The conversion is best accomplished by heating for three hours with a three per cent. sulphuric acid, the reaction being explained by the following equation: $C_{12}H_{22}O_{11} + H_2O =$

$2C_6H_{12}O_6$. A small portion of the dextrose is, however, decomposed, hence 100 parts of maltose, containing water of crystallization, yields little more than 98 parts of dextrose under the most favorable circumstances. When chlorine gas is passed through dilute solutions of dextrose and saccharose gluconic acid is formed, and invert-sugar yields glycolic acid. Under the same conditions, maltose yields an acid which is neither identical with gluconic or glycolic acid, but which has not yet been completely examined.—Arch. d. Pharm., April, 1882, p. 300; from Jour. Prakt. Chem., p. 25, 114.

Levulose—Crystallinity.—Messrs. Jungfleisch and Lefranc state that it is incorrect to call levulose non-crystallizable sugar, for they show that when pure it can be obtained in a crystalline form. One of the best methods of obtaining it in a pure state, is that of preparing it from inulin. The inulin is dissolved in ten times its weight of water, and heated at about 100° for 20 hours; the solution is then evaporated to a syrup, and purified by treatment with alcohol and animal charcoal. The levulose has a great affinity for water, and will not crystallize on simple evaporation. In order to obtain it crystalline, the concentrated syrup is treated repeatedly with absolute alcohol. which removes all the water, and the remaining syrup is then sealed up in a flask and left in a cold place; after a short time, fine needles resembling crystals of mannitol begin to form. If the same residue is dissolved in warm absolute alcohol, and the mother-liquor which separates on cooling is removed before the ordinary temperature is reached, it yields the same crystals. The authors have also prepared crystalline levulose from inverted cane-sugar, identical to all appearance with that from inulin. Levulose crystallizes in spherical groups of fine colorless crystals often 0.01 meter in length. It melts at 95°. The rotatory power varies rapidly with the temperature and strength of the solution.—Jour. Chem. Soc., February, 1882, p. 158; from Compt. Rend., 93, p. 547–550.

Gentianose—A Peculiar Sugar from Gentian.—Mr. A. Meyer has obtained the peculiar sugar of gentian-root by precipitating the filtered juice with alcohol, treatment with ether, and crystallization from alcohol. The analysis of this crystalline sugar, which the author has named "gentianose," gives the formula $C_{16}H_{66}O_{31}$. It has a slightly sweet taste, and dissolves readily in water, but is sparingly soluble in absolute alcohol. It melts at 410° F., does not reduce Fehling's solution, but readily ferments when mixed with yeast. A solution prepared at 212° F. gives a rotatory power of $+ 65.7°$, but prepared cold of only $+ 33.36°$.—Chem. Jour., June 2, 1882, p. 340; from Phar. Centralh., April and May, 1882.

ORGANIC ACIDS.

Vegetable Acids—Qualitative Determination.—Messrs. Papazoglou and Poli recommend the following method for the qualitative determination of certain vegetable acids: Precipitate the alcoholic solution of the mixed acids, which may contain malic, succinic, and citric acids, by means of chloride of calcium. Decompose (the precipitate? Rep.) with dilute sulphuric acid, and boil the filtered liquid with a few drops of a solution of bichromate of potassium. If the liquid remains yellow succinic acid alone is present. If it turns green without disengaging an odor it contains citric acid, and if the addition gives rise to a pleasant fruity smell it shows the presence of malic acid, possibly from the presence of malic ether.—Chem. Jour., February 3d, 1882, p. 62; from Monit. des Produits Chim., January, 1882.

Oxalic Acid—Production from Paraffin Oil.—J. Galletly and J. S. Thomson treated a paraffin oil, sp. gr. about .800, obtained by the destructive distillation of shale with twice its volume of nitric acid, sp. gr. 1.3. The action is at first violent, but has to be completed with the aid of a gentle heat. After the reaction is finished the liquid separates into three layers. The lower one, consisting of the excess of the acid, on evaporation at a gentle heat, yielded a crop of yellow crystals, which, after recrystallization, were obtained in a colorless condition. They proved to be pure oxalic acid. The authors identified the body by its reaction and analyses of the acid and its calcium salt. —Am. Jour. Phar., February, 1882, p. 69; from Chemical News, December 9th, 1881, p. 284.

Neutral Oxalate of Potassium—Working Formula—Mr. E. B. Shuttleworth gives the following: Dissolve a quantity of carbonate of potassium in an equal quantity of water, allow the solution to stand, and decant the clear liquid from any deposit that may have formed, into a porcelain or enamelled vessel. Add as much water as has previously been used, heat to boiling, and add, carefully and in small portions, powdered oxalic acid to exact neutrality. Filter the solution, if necessary, while hot, and set aside to crystallize. A second crop of crystals may be obtained. The proportion found by the author are 174 parts carbonate of potassium to 90 of acid; the product 202 parts.—Can. Phar. Jour., August, 1881.

Ferrous Oxalate—Preparation, and Application to the Reduction of Chloride of Silver to Metal.—See *Chloride of Silver*, under "Inorganic Chemistry."

Acetic Acid—History.—Professor James F. Babcock contributes some historical notes on acetic acid in "New Remedies" (December, 1881, p. 354–355), which will be found interesting for reference, and particularly valuable to students.

Acetic Acid—Detection of Free Mineral Acid.—Mr. J. C. Wharton recommends the following method for the detection of *free* mineral acids in vinegar. Evaporate about a fluid ounce of the suspected vinegar to a thick, syrupy extract, just capable of being stirred easily, and then let the evaporating-dish cool till the hand can bear the heat (about blood-warm), then *stir* into the extract a few grains of finely powdered chlorate of potassium; or if there is no organic extract, or very little, add a small percentage of sugar to the chlorate before mixing it as above directed.

If there should be as much as 1 per cent. of *sulphuric acid*, the mass will ignite vigorously, and, the author is confident, much less would be indicated by fire, while even minute quantities would be made known by the odor of chlorine. *Muriatic acid* would evolve the same odor but produce no fire. *Nitric acid* would not be so easily detected in this way. It would be more advantageously detected, without the addition of chlorate of potassium, by its action on copper in the form of clean wire or strips. After mixing the chlorate and the extract thoroughly with a glass rod *wait a minute or two*, stirring the mass occasionally, if it does not immediately ignite, and do not bring the face too near the mixture until several minutes have elapsed.—Am. Jour. Phar., March, 1882, p. 100–101.

Acetate of Alumina—Double Compounds.—In view of the well-known instability of the compounds of acetic acid and alumina, and its proposed introduction into the German Pharmacopœia, Mr. Jul. Athenstaedt draws attention to some double compounds prepared by him: the *aceto-tartrate, aceto-citrate,* and *aceto lactate of alumina.* All of these compounds are readily, completely, and permanently soluble in water. The author fails to give the process for their preparation.—Phar. Ztg., No. 93, 1881, p. 694; see also Liq. Aluminii Acet., under "Pharmacy."

Benzoic Acid—Tests to Determine Source.—The asserted reduction of potassium permanganate by benzoic acid prepared from urine has been the subject of several investigations. Dr. C. Schacht ("Archiv d. Ph.," November, 1881, p. 321) has made comparative experiments with benzoic acid obtained 1, from urine; 2, from toluol; 3, from benzoin (commercial); 4, from Siam benzoin by sublimation; 5, from the same by the wet process. In acid, and, more characteristically, in alkaline solution, a reduction takes place only with the last two acids. On dissolving at 15° C. 0.1 gram of benzoic acid in 3 c.c. of potassa solution, sp. gr. 1.777, diluting with 3 c.c. of distilled water, adding 5 drops of a ½ per cent. solution of potassium permanganate and heating to boiling, the first-named three kinds of benzoic acid produced dark-green colored liquids in which gradually brown precipitates appeared, while Nos. 4 and 5 produced decoloration of the liquids and brown precipitates, due to the presence of cinnamic acid.

Jacobsen ("Industrieblätter," No. 50) states that pure benzoic acid from all sources has exactly the same behavior against reagents; the source of benzoic acid can therefore only be ascertained chemically in the presence of impurities resulting from the material. Benzoic acid prepared from toluol (benzodi- or trichloride) is apt to contain chlorine, which is best detected by cupric oxide upon the platinum wire in the flame. If prepared from urine, the benzoic acid contains nitrogen, which is detected by potassa as ammonia, and has usually also an odor like horse-sweat. Benzoic acid from resin is free from nitrogen and chlorine. The test with potassium permanganate is of no value, since benzoic acid from toluol will be reduced on account of the presence of bitter-almond oil and of derivatives from cinnamic and phenyl-acetic acid; if prepared from urine, various organic compounds will effect the reduction, and if obtained from resin, cinnamic acid and empyreumatic products have the same effect. But after purification, sublimation, etc., of these acids, the reducing power is materially modified or entirely removed. Benzoic acid sublimed from the resin in imperfect apparatus always contains more of the empyreumatic reducing compounds than are obtainable in the modern apparatus with proper ventilation and low heat.—Am. Jour. Phar., February, 1882, p. 56; from Phar. Centralh., December 22d, 1881, pp. 565–567.

O. Schlickum has repeated the experiments of Schacht with acids prepared from benzoin by sublimation and the wet method, and with different artificial acids, etc., and has arrived at the conclusions that:

1. Toluol- and other artificial benzoic acids exert a very insignificant decolorizing power upon permanganate of potassium.

2. Benzoin-benzoic acid decolorizes permanganate of potassium in proportion to the amount of cinnamic acid that may be present.

He regards as the best criterion of a good benzoic acid the presence of the empyreumatic oil, which, in the absence of other reliable tests, is best recognized by the odor. If an acid, having a strong odor of the peculiar benzoin empyreuma, is then tested with permanganate of potassium a knowledge of the source may be arrived at with some degree of probability; if 0.10 gram of the acid or its soda salt is capable of decolorizing 10 to 15 drops of a 1 pro mille solution of permanganate, it is *probably* an acid obtained from benzoin; but if a permanent red color is produced with 3 to 4 drops of the solution, the acid is *probably* artificial. The author considers the empyreumatic oil a most important component, and therefore believes a toluol-benzoic acid, which has been sublimed with benzoin and has a strong empyreumatic odor, to answer all the requirements for medicinal application. The author's experiments prove benzoin-benzoic acid, when perfectly purified, to be almost completely devoid of action on permanganate, whilst a small quantity of cinnamic acid, separated from benzoin-benzoic acid, possessed the power of decolorizing permanganate of potassium to an almost unlimited extent. The separation of the two acids is effected by the addition of nitrate of silver (to the soda salt? Rep.), which precipitates both; but benzoate of silver is soluble in hot water, whilst the cinnamate remains undissolved.—Pharm. Zeitg., No. 4, 1882, p. 24.

In a further article, which is in reply to some criticism of Schneider, Schlickum draws attention to the observation that the empyreumatic oil of benzoin also has the property of reducing permanganate of potassium. If the reducing action is due to empyreumatic oil alone a mixture of 0.10 gram of the benzoic acid, 6 grams of *hot* water, and 8 to 10 drops of a ½ per cent. solution of permanganate is decolorized immediately or after five minutes, *and acquires no odor;* but if cinnamic acid is present, *an odor of bitter almond is developed* under the same conditions. The presence of cinnamic acid may, furthermore, be determined by the insolubility of a portion of the precipitate produced when the soda salt of the suspected acid is treated with solution of nitrate of silver. In the case of pure benzoic acid (free from cinnamic) the precipitate obtained in a solution of its soda salt in 250 parts of water, is completely dissolved when heated to boiling. But if the pure benzoic acid has been prepared from benzoin by sublimation it will reduce a portion of the nitrate of silver in ammoniacal solution when heated to boiling, a reaction which is not shared by the acid made by the humid method from benzoin, nor by the artificial (toluol) acid, even if it has been sublimed with a quantity of benzoin. This reaction the author considers available for the identification of sublimed benzoin-benzoic acid, and is executed as follows: 0.10 gram of the benzoic acid is shaken with a few grams of water, and several drops of solution of nitrate of silver are added, followed by an excess of ammonia-water. The liquid, which has become clear, is then heated to boiling, when, if sublimed benzoin-benzoic acid, it assumes a brownish to blackish color. Toluol-benzoic acid, which had been sublimed with half its weight of benzoin, contrary to the author's expectation, did not produce this reaction, which is doubtless due to the empyreumatic oil. He accounts for this by the assumption that when benzoic acid is resublimed it passes over at a temperature below that at which empyreumatic oil is formed.—Phar. Ztg., No. 24, pp. 175–176.

Benzoic Acid—Preparation and Identification of the Sublimed Article.—In view of the difficulty of obtaining the sublimed acid, prepared from Siam benzoin, in the market, Mr. C. Schneider recommends that this be prepared by the apothecary, since the process is one of the most simple. The most suitable apparatus for this purpose is that described by Hager (see "Pharm. Praxis.," I., p. 21). It should be heated with a gas-lamp, provided with numerous small flames, and which is easily regulated, so that a temperature of 150° to 160° C. may be maintained with ease. The mixture of powdered Siam benzoin (1 part) and dry sand (2 parts) must be exposed to drying over lime for about a week. The author obtained, as a mean of several operations, 11.37 per cent. of benzoic acid. By the wet method of Scheele, he obtained 15.12 per cent.; but an examination of seven different samples showed the presence of 17 per cent. of benzoic acid with much uniformity. The author considers it important that benzoic acid, which is to be used as such, should be that prepared from benzoin by sublimation; while for its compounds (benzoate of sodium, etc.) the commercial acid, if pure, will answer every purpose.

The different criticisms to which the above-noted method of Schacht for the identification of benzoic acid from resin has been subjected, have induced Mr. Schneider to make numerous experiments, which lead him to the conclusion that the permanganate test, with the aid of the physical characters (appearance and odor) not only serve for the identification of the acid, but also determine such falsifications as are or may be employed. On the other hand the method of Schlickum (see above), by means of ammoniacal nitrate of silver, is not reliable, as shown by experiments made with different kinds of the acid.—Arch. d. Pharm., June, 1882, pp. 401–413.

Mr. Ed. Schaer, referring to the observations of Schacht, Schlickum, and Schneider, has also experimented to determine the action of different kinds of benzoic acid on permanganate of potassium, and summarizes his observations as follows:

1. Benzoic acid, sublimed directly from benzoin, exerts a remarkable reducing action upon permanganate, both in acid and in alkaline solution, which is not shared by any other kind of benzoic acids, or only to a limited extent, and in proportion to foreign admixtures present. In alkaline solution these latter acids produce a green coloration, dependent on a weak reducing action.

2. Benzoic acid, extracted from benzoin by hydrate of lime, has the same reaction as the artificial acid, and reacts similarly to the sublimed acid from benzoin only when it is prepared from sublimation residues, or when it is prepared from material containing cinnamic acid.

3. Benzoic acid prepared from benzoin, with hydrate of lime, does not acquire the action of the acid obtained by direct sublimation upon permanganate, even if it is subsequently sublimed.

4. The reducing character of the sublimed acid upon permanganate

may be given to the benzoic acids not made by the officinal method, if they are sublimed with benzoin; but even with the addition of 20 per cent. of benzoin before sublimation, this action is materially inferior to that of the genuine acid.

5. Cinnamic acid, by itself, exerts a very energetic reducing action upon permanganate, very similar to that of sublimed benzoin-benzoic acid, both in acid and alkaline solutions. In admixture, therefore, with benzoic acids that react negatively in this respect, it causes a certain modification in their reactions upon permanganate.

6. Benzoic acid, which reacts negatively with permanganate, *i. e.*, that does not change an acid solution, and only colors the alkaline solution green (as in benzoin-benzoic acid prepared by the humid method), does not acquire the property of immediately decolorizing the permanganate, even if 10 per cent. of cinnamic acid is present; the change does not occur until after several minutes. It follows, that even a relatively large admixture of cinnamic acid does not give to the other kinds the property of the sublimed benzoin-benzoic acid.—Arch. d. Pharm., June, 1882, pp. 425–430.

Benzoic Acid—Commercial Quality.—Professor P. W. Bedford, in reply to a query, states that the acid sold as benzoic acid from benzoin, is, as a rule, prepared from benzoin. Considerable benzoic acid, prepared from toluol, has been imported in recent years, but by far the largest demand is for the acid made from hippuric acid. The latter often has an unpleasant odor, which is suggestive of the source, while the toluol-benzoic acid retains the odor of nitrobenzol to some extent. As regards the

Benzoate of Sodium of commerce, the samples that came under the author's notice were, with few exceptions, made from true benzoic acid. Samples prepared by him with the three acids, respectively, show no external distinction, and when made from a carefully prepared hippuric benzoic acid, this has no manifest odor of its origin about it. It is different, however, with the toluol-benzoic acid, which carries into the benzoate a contamination of chlorinated substitution products, the principal one being chlorobenzoate of sodium, of which as much as 15 per cent. has in some instances been detected.—Drug. Circ., September, 1881, p. 129.

Benzoic Acid—Yield by Sublimation from Siam Benzoin.—See *Benzoin*, under "Materia Medica."

Benzoate of Sodium—Preparation.—Mr. R. Rother recommends the following process for the preparation of benzoate of sodium, which has the advantage of avoiding strong effervescence, and the use of a comparatively small amount of water: Mix 4 ounces of benzoic acid and 2¾ ounces bicarbonate of sodium in an evaporating-dish, and 2 to

4 fluid ounces of strong alcohol. When the acid is dissolved and a uniform magma has resulted, add gradually 3 to 6 fluid ounces of water and apply heat at intervals to hasten the reaction, if necessary. After the combination is complete, heat the capsule, containing the moist salt, upon a stove or sand bath, until by occasional stirring a dry white powder is obtained.—The Pharmacist, January, 1882, p. 6–10.

Benzoate of Sodium—Solubility in Alcohol.—Hager prepared sodium salts with benzoic acid, prepared from the resin in the dry and wet way, from urine and from calcium phtalate. All these salts were found to require 13 parts of alcohol, sp. gr. .835, for solution, at a temperature of 17° to 20° C., the figures obtained for 100 parts of the alcohol varying between 7.5 and 7.9 of benzoate; the difference is due to adhering moisture.—Am. Jour. Phar., January, 1882, p. 16; from Ph. Centralhalle, 1881, p. 435.

Benzoic Bromide—Preparation.—There being no efficient method for preparing this body, L. Claisen has adopted the following: Finely powdered (fused) benzoic acid (3 mols.) and phosphorus tribromide (2 mols.) are warmed and digested together in a flask with reflux condenser; after a quarter of an hour's heating the mixture is distilled in a vacuum, and the distillate rectified at ordinary pressure. From 500 grams of benzoic acid, 400 grams of bromide are obtained. Benzoic bromide is a colorless pungent liquid (b. p. 218°–219°), sp. gr. 1.570 at 15°. On cooling it to —24°, it solidifies to a white prismatic compact crystalline mass (m. p. about 0°). In its behavior, it resembles benzoic chloride, but is more easily decomposed. "Benzoic bromide," prepared by Liebig and Wöhler's method by the action of bromine on benzaldehyde, or by Paterno's method with bromine and benzoate of ethyl, is not this body, but benzylidene bromobenzoate, formula CH PhBr.BzO.—Jour. Chem. Soc., May, 1882, p. 514; from Ber. d. d. Chem. Ges., 14, p. 2473–2476.

Cinnamic Acid—Antiseptic Value.—Cinnamic acid is attracting some attention as an antiseptic, and is said to have all the valuable properties of the better-known antiseptics (such as carbolic and salicylic acid), while it is free from some of their objectionable properties. Its expensiveness has hitherto prevented its extended application in medicine, but it is now prepared at a comparatively moderate price synthetically. It is free from taste and odor, and is not poisonous. Its sparing solubility in water ($\frac{1}{10}$th of 1 per cent.) is considered rather an advantage than otherwise. Its solubility in other substances is as follows: 1 part of cinnamic acid dissolves in 66 parts of olive oil, in 66 parts of spermaceti, in 50 parts of a 2 per cent. solution of borax, and in 400 parts of glycerin. In alcohol cinnamic acid dissolves very freely, and this solution is the most convenient for soaking lint, jute, etc., for the Lister bandage. The pulverulent residue of cinnamic acid, separated after the evaporation of the alcohol, has no irritating action upon the skin. A solution of the freely soluble cinnamate of sodium has been applied for washing wounds. Whether or not this sodium compound also possesses antiseptic properties is now being investigated. The antiseptic value of the acid is supported by recent experiments of Prof. Fleck, of Mr. Schwartz, and of Dr. Lemcke, the last-named being assistant of Prof. Langenbeck, of the Royal Hospital, Berlin.—New Rem., November, 1881, p. 328.

Cinnamic Acid—Solubility and Antiseptic Value.—Attention having been drawn to the antiseptic properties of this acid, which appears to be obtained as a by-product in the preparation of benzaldehyde, benzoic acid, and benzoic ether, Mr. J. B. Barnes has made a number of experiments to determine its solubility in different solvents, as well as its antiseptic value. He finds the solubility of the acid, furnished him in large brilliant crystalline plates by one of the exhibitors at the International Sanitary Exhibition, at South Kensington, to be as follows: In lard, 3.0 per cent.; in cacao butter, 0.5 per cent.; in expressed oil of almonds, 1.0 per cent.; in cod liver oil, 2.0 per cent.; in white wax, 3.0 per cent.; in paraffin, 0.5 per cent.; in oleic acid, 5.0 per cent.; in benzol, 1.0 per cent.; in ether, 20.0 per cent.; in chloroform, 8.0 per cent.; in glycerin of borax, 1.5 per cent.; in water, 0.1 per cent.; in olive oil, 1.5 per cent.; in vaseline, 2.5 per cent.; in spermaceti, 1.5 per cent.; in 2 per cent. watery solution of phosphate of sodium, 2.0 per cent.; in 2 per cent. solution of borax, 4.0 per cent.; and in glycerin, 0.25 per cent.

The antiseptic effects of cinnamic acid are as follows:

4 fluid ounces of albumen solution, with 2 grains of the acid, at 60° F., became putrid on the eighteenth day, while with 4 grains of the acid it remained bright and free from putridity during the same period.

4 fluid ounces of gelatin and water, with 2 grains of cinnamic acid, at 60° F., became putrid on the fifteenth day, while with 4 grains of the acid it remained bright and firm, though seventeen days had elapsed.

4 fluid ounces of urine, with 2 grains of the acid, at 60° F., became cloudy on the twenty-ninth, putrid on the thirty-first day.

4 fluid ounces of decoction of malt with yeast, with two grains of the acid, at 60° F., retarded fermentation most distinctly.

4 fluid ounces of infusion of malt made with cold water, with 2 grains of the acid, at 60° F., broke down on the thirty-sixth day, while with 4 grains of the acid it has remained unchanged for fifty-one days.

4 fluid ounces of acid infusion of roses, with 2 grains of the acid, at 60° F., has remained unchanged sixty days.

4 fluid ounces of infusion of hay, with 4 grains of the acid, at 60° F., has remained bright and retained its pleasant odor, although seventeen days have elapsed.

The acid has not the slightest effect in retarding the action of pepsin on hard-boiled egg albumen. This is an advantage in the event of its being used as a medicine.—Phar. Jour. Trans., December 10, 1881, p. 477–478.

Salicylic Aldehyde—Antiseptic and Antizymotic Action.—This compound, formerly called salicylic hydride, and salicylous or spiroilous acid, is contained in herbaceous spiræas, and is prepared by Piria's process, by distilling a mixture of 10 parts of salicin, 10 potassium bichromate, 25 sulphuric acid, and 200 water, the oily compound separating from the distillate. Pierre Apéry found that meat may be kept in an aqueous solution of this compound without putrefying, and that a few drops of the oil will preserve urine ("L'Union Phar.," 1876, p. 82).

Since then he has observed that a few drops dissolved in a little alcohol will preserve a corpse for 3 or 4 days, if injected in the carotid artery, or, better still, into the mouth. Dr. Christides has preserved cadavers by such injections made into the buccal and anal cavities. The putrefaction of animal bodies which may still progress in solutions of salicylic acid is totally arrested by the addition of a few drops of salicylic aldehyde. Solutions in glycerin, alcohol, and water have been successfully employed as antiseptics, both in private practice and in the war of 1877, and an addition of a small quantity of it to solutions of zinc acetate has proved very effectual in obstinate cases of blennorrhagia. The high price of this compound is an obstacle to its more extended use.—Am. Jour. Phar., January, 1882, p. 16; from Etude sur l'hydrure de Salicyle, Constantinople.

Salicylic Acid—Impurities, etc.—Dr. E. R. Squibb finds that while the ordinary amorphous salicylic acid of commerce contains a large percentage of the contaminating acid first noticed by Mr. John Williams (see Proceedings, 1878, p, 536), the markets have been supplied during the past few years with a well-crystallized acid, which does not contain more than 3 or 4 per cent. of impurities. Such an acid is all that can be needed for medical uses, and is quite as pure as any made from oil of wintergreen, and any toxic effects from such an acid or from the sodium salt made from it must be due either to idiosyncrasy or mismanagement. A well-made sodium salt from such an acid is always white, but, after being shut up long in a bottle, is liable to have a faint odor of carbolic acid. An extemporaneous solution of

Salicylate of Sodium is easily and quickly made by the following formula, which is based on careful calculations and experiments made by the author:

Take of salicylic acid, well-crystallized, 437 grains; bicarbonate of sodium, 270 grains; water, free from iron, a sufficient quantity. Put the acid into a vessel of the capacity of a pint, add 4 fluid ounces of water, stir well together, and then add the bicarbonate of sodium in portions, with stirring, until the whole is added and effervescence is finished. Filter the solution, and wash the filter through with water until the filtered solution measures 6 fluid ounces. Each fluid drachm contains 10 grains of the medicinal salicylate of sodium. If made from good materials, the solution, before filtration, is of a pale amber color, but as most ordinary filtering-paper contains traces of iron, the filtered solution is often of a deeper tint. In common with other bitter and nauseous salines, it is best taken simply diluted with ice-water. —"Ephemeris," No. 3, 1882, pp. 72–76.

Salicylic Acid—Determination in Beverages.—According to A. Rémont, beer and cider are previously freed from carbonic acid by heating to 58° or 60°. Wine is concentrated to one-third of its volume by heating to from 70° to 80°. The cold liquid is treated three times with its volume of ether washed with water. The agitation should not be too violent, lest the ether forms an emulsion. Each treatment of ether is followed by a decantation. The united ethereal solutions are distilled, and then evaporated spontaneously. The residue is weighed, and treated by its volume of chloroform, washed in water, and applied in three portions. The chloroformic solution is evaporated and the residue dissolved in water brought to a definite measure. It is then submitted to a colorimetric test in comparison with a freshly-prepared solution of salicylic acid containing 0.2 gram per liter.—Chem. News, November 4th, 1881, p. 226; from Jour. de Phar. et de Chim., July, 1881.

Salicylic Acid—Detection in Urine.—L. Siebold and T. Bradbury direct attention to the fact that the well-known reaction with ferric chloride answers quite well in all cases for the detection of salicylic acid in urine, and that the more troublesome modes that have at different times been recommended by chemists are unnecessary. It is only in the case of very highly colored urines, and in cases of urines containing so minute a trace of salicylic acid as to require concentration by evaporation, that the removal of coloring matter, phosphates, etc., affords any decided advantage. In such cases the authors recommend the following process, by which the introduction of mineral or other free acids (so objectionable in some of the proposed processes) is entirely avoided: Mix the urine to be tested with a few drops of potassium carbonate, or sufficient to render it slightly alkaline; then add strong solution of lead nitrate in excess, shake well, filter, return the filtrate to the filter until it passes through quite clear, and now test the clear liquid with a few drops of a very weak solution of ferric chloride. In all ordinary cases, however, the authors prefer the direct addition of the ferric chloride to the urine. If much ferric phosphate is precipitated by the addition of the reagent, it is advisable to add the latter drop by drop until a coloration begins to be perceptible, then to filter, and to add a few more drops of the reagent to the filtrate.—Yearbook of Phar., 1881, pp. 449–451.

Salicylate of Sodium—Incompatibility with Nitrous Ether.—Mr. A. W. Gerrard draws attention to a curious reaction occurring in a mixture of salicylate of sodium (gr. xv), spir. nitrous ether (♏ xv), and camphor-water (℥i). The mixture, at first colorless, after standing twenty-four hours showed a distinct tinge, which gradually increased, until at the expiration of two weeks it was almost black, and contained a black deposit. At the same time the odor of oil of wintergreen was developed. Experiments proved that camphor is no element in this change, the same occurring when pure water is used. Salicylate of ethyl and sodium nitrate are, doubtless, produced in the reaction, but the changes are evidently more complex, to judge from the color of the mixture. The mixed character of spirit of nitrous ether of commerce, introduces elements which may play an active part in this interesting example of incompatibility.—Pharm. Jour. Trans., November 5th, 1881, pp. 377–378.

Salicylate of Sodium—Physiological Action.—Dubrisay reports three cases of young, vigorous men, in whom very marked impotence of temporary duration was produced by taking 45 to 50 grain doses of salicylate of sodium for twenty days while under treatment for rheumatism. Dr. Oehlschläger, of Dantzic, says, in "Allgemeine Medicinische Central Zeitung," May 7th, 1881, that he has found this remedy of great value in the treatment of nervous headache, especially if given in a dose of 1 gram (gr. xv) in the beginning of an attack. It usually produces drowsiness, and after a few hours the patient wakes up refreshed and free from pain. It, however, often fails to produce this effect in cases dependent on anæmia.—Am. Jour. Pharm., September, 1881, p. 474.

Salicylate of Calcium—Preparation, etc.—Mr. J. L. T. Davidson offers the following process for the preparation of salicylate of calcium. Mix 2 ounces and 155 grains of precipitate carbonate of calcium with 20 fluid ounces of water in a porcelain capsule, add 6 ounces and 196 grams of salicylate acid, in portions of one-sixth at a time, applying heat during the addition, and stir until the reaction ceases. Continue the heat until the mixture becomes somewhat granular, and finish the drying on a water-bath under constant stirring. A white or pale-pinkish powder is then produced, which has a sweetish, afterwards somewhat hot and astringent taste, and produces some irritation in the throat. As an average of three experiments, it was found to be soluble in 34.551 parts of water at 15.5° C.—The Pharmacist, May, 1882, pp. 174–176.

Salicylates of Mercury—Preparation and Composition.—H. Ladoux and A. Grandval have studied the compounds of mercury and salicylic acid, and find that two kinds of mercuric and mercurous salts are formed—neutral and normal.

Neutral Mercuric Salicylate ($C_6H_4.CO_2HgO$) is amorphous, dazzlingly white, insoluble in water, alcohol, and ether, but soluble in solution of sodic chloride, or in solutions of potassic iodide and of potassic cyanide. Its solution in sodic chloride does not reveal the presence of mercury by ordinary tests. To obtain it, twice as much salicylic acid as is indicated in the formula of the compound is heated to boiling with a molecule of yellow oxide of mercury and water. If only 1 molecule of acid is used, no combination takes place.

Normal Mercuric Salicylate $(C_6H_4.CO_2.OH)_2Hg$, is obtained by precipitating a weak solution of normal sodic salicylate in excess by a weak solution of mercuric nitrate, and carefully washing the white amorphous precipitate. This salicylate has all the properties of mercuric salts

Neutral Mercurous Salicylate ($C_6H_4.CO_2.O.Hg_2$) is obtained by treating the normal mercurous salicylate with ether in large excess, whereby 1 molecule of salicylic acid is removed. The compound closely resembles serum, after it has been treated with ether, and has a dark-greenish color when it is dried at 212° F. It is blackened by alkalies, turns green with potassic iodide, gives mercurous chloride with hydrochloric acid; in a word, it gives all the reactions of the ordinary mercurous salt.

Normal Mercurous Salicylate $(C_6H_4.CO_2.OH)_2Hg_2$, is obtained by double decomposition, by precipitating salicylate of sodium in excess by a solution of mercurous nitrate as little acid as possible, and washing with boiling water.—New Rem., May, 1882, pp. 153–154; from Jour. de Pharm. et de Chim., and the Chemist's Jour., March 10, 1882.

Lactic Acid—Preparation from Sugars by the action of Potassium or Sodium Hydrate.—H. Kiliani has made the important announcement that lactic acid may be readily prepared by the action of potassium or sodium hydrate upon both grape-sugar and invert-sugar, or cane-sugar, after treatment with dilute acids.

In his first paper he gives the following directions: Dissolve 1 part of grape-sugar in 1 part of water, and then 1 part of potassium hydrate in ½ part water. The cooled solutions are mixed in such proportion that for every 10 grams of sugar 10 cubic centimeters of potash solution is used. In working with larger amounts the alkali must be added slowly and with constant cooling. The mixture is then warmed for several hours in a stoppered flask to about 35° C., and then allow the temperature to rise gradually to 60° C., and digest until the solution no longer reduces Fehling's solution. This will ordinarily take from six to seven hours' heating. In the meantime determine by simple titration how much of a very concentrated sulphuric acid (3 parts pure acid and 1 part water) is needed to neutralize a given amount of the alkali used in the above experiment. After the cooling down of the mixture in the flask a sufficient amount of sulphuric acid is then added to neutralize the alkali that had been used. While the sulphuric acid is being added potassium sulphate separates out, and the liquid, at first reddish-brown, becomes clearer in color as it becomes acid. It is then concentrated somewhat, and 93 per cent. alcohol is added, with stirring, until a test filtered off remains clear with barium chloride. The filtered alcoholic solution is warmed over the water-bath with carbonate of zinc that has been rubbed up with water to a thick paste, and then filtered boiling hot. If too much alcohol had not been added previously, on cooling the filtrate solidifies to a magma of zinc lactate that is made pure by a single recrystallization. The weight of the first crystallization amounted in one experiment to 44 per cent. of the pure grape-sugar used, which would correspond to 27 per cent. of pure lactic acid.

In a second paper, Kiliani gives fuller results and still more satisfactory directions for the preparation of lactic acid. He here states that the best material for the preparation of lactic acid is invert-sugar, as it gives a better yield than ordinary glucose; and that caustic soda is to be preferred strongly to caustic potash. Besides its greater cheapness he finds that the sodium sulphate formed on neutralizing takes up the greater part of the water present, combining with it as water of crystallization. The presence of sulphate in the alcoholic solution can, with proper manipulation, and without the use of too much alcohol, be reduced to a minimum. It is not advantageous to neutralize the entire alcoholic solution with zinc carbonate, as the zinc salt of another acid that is produced at the same time as the lactic acid does not crystallize and interfere with the crystallization of the zinc lactate. The procedure now recommended by Kiliani is as follows: 500 grams of cane-sugar are placed, with 250 grams of water and 10 cubic centimeters of the sulphuric acid to be used later, in a stoppered flask of 2 liters capacity, and heated for three hours to about 50° C. The solution of invert sugar so obtained is colorless, or at most faintly yellow. After cooling, there is added to it, in portions of 50 cubic centimeters at a time, 400 cubic centimeters of a caustic soda solution made by dissolving 1 part of caustic soda in 1 part of water. The strong alkali settles at first as a slimy mass on the bottom, and a new portion is only to be added when the mixture has become perfectly homogeneous by shaking around. The flask should also be cooled with water while the alkali is being added. The mixture, nevertheless, takes color and becomes greatly heated. Finally, the mixture is heated to 60° to 70° C., until a test heated over a boiling water-bath does not separate cuprous oxide from Fehling's solution, but gives it only a slight greenish tinge. Into the cooled mixture the calculated amount of sulphuric acid (made by mixing 3 parts of sulphuric acid with 4 parts of water) is then run. As soon as the acid liquid has cooled to the temperature of the room drop in a crystal of Glauber's salt, and dip the flask in cold water until a thin crystalline crust forms on the sides, which is then removed by rapid shaking about of the flask. Cooling and shaking are continued until a crust no longer forms, when the mixture is allowed to stand quiet for twelve to twenty-four hours. At the end of this time the contents of the flask appear to consist of a crystalline cake, soaked with a reddish liquid. There is then added 93 per cent. alcohol, and the whole is shaken up until on further addition no precipitate separates out. The separated Glauber's salt is separated from the alcoholic solution by a vacuum filter, and can be washed with relatively very little alcohol. The half of the alcoholic solution is neutralized over the water-bath with carbonate of zinc, filtered boiling hot, and united with the other half. The crystallization begins immediately upon cooling, and is complete after thirty-six hours' standing. The lactate of zinc so obtained can be pressed free from mother-liquor and recrystallized once, when it is perfectly pure. The weight of this first crystallization amounts to 30 to 40 per cent. of the sugar used. The concentrated mother-liquor yields yet another portion of crystals, which are nearly pure, although slightly yellowish in color.—Am. Jour. Pharm., May, 1882, p. 216; from Ber. Chem. Ges., xv., pp. 136 and 699.

Bismuthi Lactas (Lactate of Bismuth)—Formula of the Dutch Society for the Advancement of Pharmacy.—Subnitrate of bismuth, 61 parts; water of ammonia, 50 parts; lactic acid, 55 parts; distilled water, q. s. Mix the subnitrate of bismuth, in a flask, with the water of ammonia previously diluted with 75 parts of distilled water. Let the mixture stand for one hour, pour off the supernatant liquid, and wash the residue thoroughly with distilled water. To the moist residue add the lactic acid, and evaporate the mixture to dryness on the water-bath. The product is a white powder, difficultly soluble in water, and insoluble in alcohol.—New Rem., March, 1882, p. 74.

Succinic Acid—Occurrence in an Incrustation on the Bark of "Morus Alba."—G. Goldschmidt has often observed on the stems of mulberry trees, both young and old, the exudation of a liquid, which dried up to crystalline crusts, especially on the side exposed to the wind. This liquid, which had a saline taste, was found to consist of a solution of succinate of calcium, which, after several recrystallizations with the aid of animal charcoal, melted at 180°, and was converted by distillation into the anhydride, melting at 160°. The liquid also contained a small quantity of carbonate of calcium.

The occurrence of exudations on mulberry-trees was observed long ago by Klaproth, who regarded them as consisting of the calcium salt of an acid which he called "maulbeerholzsäure," and similar observations were afterwards made by Landerer. Gmelin (Handbook, Eng. ed., 8. 109) suggests that the acid found by these chemists was nothing but succinic acid, a suggestion which is corroborated by Mr. Goldschmidt's experiments. The occurrence of succinic acid is perhaps due to a fermentation process, in consequence of which the malic acid occurring in the juice of the mulberry tree (Gmelin, 10, 481) is converted into succinic acid, a metamorphosis which, according to Fitz (Ber. d. d. Ch. Ges., 12, 481), takes place somewhat readily in schizomycetic fermentations.—Jour. Chem. Soc., June, 1882, p. 602; from Monatsh. Chem., 3, p. 136–138.

Ammoniated Citrates—Solubility in Water.—It is well known that many metallic oxides and citrates, insoluble in water, are soluble in the alkaline citrates, even in the presence of reagents, which under ordinary conditions precipitate these oxides. Some years ago, Spiller (Phar. Jour. Trans., 1858) carried on a series of investigations, in order to study the influence of citric acid in preventing the precipitation of the metallic oxides, and arrived at the general result that the neutral citrates possess the property of combining with other salts to form a class of compounds of the general formula $M'_3C_6H_5O_7 + 3M'_2SO_4$, in which sulphuric acid may be replaced by carbonic, chromic, or boracic acid. For instance, solutions of these compounds are not precipitated by nitrate of barium until a slight excess of sulphate of sodium is present. Lebaigne, however, considers that these phenomena are due to an interchange between the acids and bases, which is stable only so long as the citrate liberated in the nascent state is soluble, and thus the peculiar characteristics of the acids and bases present become apparent when the nascent citrate has saturated the alkaline citrate, that is to say, when the precipitate is in excess of the alkaline citrate. Further, the insoluble citrates are dissolved in alkaline citrates in definite proportions, and citric acid being tribasic can saturate not only three equivalents of the same, but also of different bases to form soluble salts. E. Landrin has now taken up the question in order to decide these views, and has arrived at results in accordance with those of Lebaigne, *i. e.*, citrates insoluble in water dissolve in alkaline citrates, with formation of double salts of the composition $M_2M'C_6H_6O_7$, in which M is an alkali metal, and M' a metal belonging to some other class. The author explains his views by examples and numerous analyses of such double compound.—Jour. Chem. Soc., June, 1882, p. 604; from Am. Chim. Phys. (5), 25, 233–257.

Malic Acid.—Yield from the fruits of *Sorbus aucuparia*, L., which see, under "Materia Medica."

Kinovic (Chinovic) Acid (Cinchona-bitter).—This substance, which is obtainable as a by-product in quinine factories, is described in the "Non-Official Formulary of the Dutch Society for the Advancement of Pharmacy," as follows: It appears as a white or light-yellow, very bitter powder, which is a mixture of chinovic acid and of a glucoside thereof, chinovin. It is soluble in ammonia and in lime-water to a clear solution, from which it is thrown down by acetic or hydrochloric acids. It is also soluble in strong, boiling alcohol, and on cooling, forms in microscopic crystals. Chinovin may be separated from it by a mixture of equal parts of strong alcohol and water. The

Kinovate (Chinovate) of Calcium may be prepared as follows: Lime (freshly prepared), 1 part; kinovic acid, water, of each q. s. Mix 4 parts of the acid with the lime and a little water to a uniform mixture, and add to it afterwards the rest of the water. Filter and mix the clear solution, by triturating in a mortar, with a little chinovic acid, so that a small quantity of it remains undissolved. Filter, evaporate on the water-bath to dryness, and powder the residue.

The salt is completely soluble in 30 parts of water. It is less soluble in warm water; the cold saturated solution, when warmed, becomes thick like starch-paste.—New Rem., January, 1882, p. 11.

Myronic Acid—Presence in the Seeds of Brassica Rapa.—H. Ritthausen has found a considerable proportion of potassium myronate in yellow and brown turnip seeds from India, as well as in such grown in East Prussia, and the seeds and press cakes yielded oil of mustard. However, rape seeds, from Brassica Napus, grown in Russia and in Prussia, were free from myronic acid, and yielded not a trace of oil of mustard. Am. Jour. Phar., February, 1882, p. 77; from Phar. Ztg., October 26th, 1881, p. 645.

Abric Acid.—A new crystalline substance from *Abrus precatorius* (Ruttee seeds), which see, under "Materia Medica."

Uric Acid—Rapid Determination.—By operating as follows Mr. A. Pettit effects the determination of uric acid in two hours: 200 c.c. of the filtered urine are mixed with 5 c.c. of fuming hydrochloric acid, and the mixture is beaten up for five minutes in a beaker, care being taken not to scratch the glass. The liquid, which is clear at first, becomes turbid and deposits the uric acid in the form of very small crystals. It is allowed to stand for an hour in a cool place, and filtered through a previously tared double filter of quick-filtering paper. The filters are washed with alcohol, dried at 100°, and the difference of weight between the two, multiplied by 5, gives the quantity of uric acid in a liter of urine.—Chem. News, October 28th, 1881, p 215; from Jour. de Phar. et de Chim., June, 1881.

Biliary Acids—Modification of Pettenkofer's Test.—E. Drechsel recommends the following modification: Add to the solution of the biliary salts (with alkalies), which should be as concentrated as possible, and should be contained in a test-tube. syrupy phosphoric, instead of sulphuric acid, until the whole liquid appears to be somewhat syrupy. Next add a little cane-sugar, and heat the test-tube by setting it in the neck of a flask containing boiling water. After a short heating, the characteristic red or red violet-color will make its appearance, even if only traces of biliary acids are present. At the same time, it is not necessary to avoid the addition of an excess of cane-sugar.—New Rem., April, 1882, p. 120; from Journ. f. prakt. Chem. (N. F.), 24, 44, and Zeitschr. f. Anal. Chem., 1882, p. 150.

In connection with the above, the editor of "New Remedies" says: We find that the above reaction succeeds best in the following manner: Put about 5 c.c. of syrupy phosphoric acid in a test-tube, add 2 drops of a fresh solution of cane-sugar (1:4), and afterwards 1 drop of the solution containing biliary acids. This solution may be quite dilute. Fresh ox-gall, diluted with 50 times its volume of water, will give the reaction very nicely. (We have not ascertained the limit of delicacy.) Then set the test-tube in the neck of a flask containing boiling water. In a very short time the surface of the liquid in the test-tube will assume a rosy tint, which will permeate the remainder of the liquid, but will always be a little darker near the surface, where air is present. The tint of the liquid will gradually darken, and finally become scarlet or claret-red.

Tannin of Oak-bark—Preparation and Constitution.—According to experiments of J. Löwe, oak-bark tannin is not, as is usually believed, a glucoside, furnishing glucose and oak-bark red on treatment with acid, but is simply transformed by dehydration into the latter substance, with formation of very small amounts of intermediary products. For the preparation of the oak-bark tannin in a pure state the bark is extracted with 90 per cent. alcohol, the alcohol removed from the tincture by distillation, and the residue treated with water in which it partly dissolves, yielding a dark-brown solution and leaving a reddish-brown insoluble substance. The solution, when saturated with chloride of sodium, deposits tannic anhydride, whilst the solution, on treatment with ether (in which the oak-bark tannin is practically insoluble) yields to the latter some gallic and ellagic acids. After the removal of the ether the solution is shaken with acetic ether, in which the tannin dissolves, and is obtained in the form of a reddish-brown brittle mass. With ferric salts its solution gives a blue-black, with tartar-emetic, gelatin, albumen, or alkaloids, yellowish-white precipitates. It readily yields "oak-red" when heated with dilute acids under pressure. The relations between the various products obtained is seen from the following formulas:

Two hydrates of tannic acid, $C_{28}H_{24}O_{12}$, $3H_2O$ and $C_{28}H_{24}O_{12}$, $2H_2O$.

The lead salt, $C_{28}H_{18}Pb_3O_{12}.5H_2O$.

Tannic anhydride, $C_{28}H_{24}O_{12}$.

Its lead salt. $C_{28}H_{22}PbO_{12},3H_2O$.

Oak-red, $C_{28}H_{22}O_{11}$.—Jour. Chem. Soc., October, 1881, p. 901; from Anal. Zeits.

Tannin—Extraction by Dialysis.—Some time ago it was proposed to prepare tannic extracts in Hungary from a variety of barks and woods, especially chestnut wood and oak. Mr. O. Kohlrausch has thoroughly investigated this question, and succeeded in devising a process of extracting tannin in almost theoretical quantities from different kinds of bark. The mode of procedure, necessary apparatus, and plants are described in detail in "Dingl. Polyt. Jour.," 240, p. 72–75. With regard to the experimental part of the paper the author concludes that as in tanning the tannin enters the skin by osmosis, it similarly leaves the cells of plants through their permeable membrane, chemical and microscopical examination having shown that the interior of the uninjured cells is the same as the exterior of thick bark which had already been utilized. Hence it is not requisite to divide the bark into very small particles, but pieces may be used with advantage which are small enough to allow the dialyzing operation to take place in a battery of closed vessels, thus avoiding the danger of choking up the valves or pipes of the apparatus. Experiments have shown that tannin passes through the animal membrane very rapidly in the dialyses, that in a short interval very fine extracts run from a battery, and that the residual bark (of the size of peas) is almost entirely free from tannic acid.—From Jour. Chem. Soc., September, 1881, in Phar. Jour. Trans., October 29th, 1881, p. 363.

Tannin—Determination.—Mr. A. Remont, after reviewing various processes, gives the following: 20 grams of the well-ground sample are exhausted by alternate maceration and percolation in a tall cylindrical glass tube, about 200 c.c of percolate being obtained. This part of the operation must be as rapid as possible, so as to prevent the change of the tannin. 20 c.c. of this liquid, corresponding to 1 gram of the substance, after the addition of 6 drops of sulphuric acid, are titrated with a 1 per cent. solution of gelatin, to each 10 c.c. of which 3 drops of sulphuric acid are added, and which has been standardized by means of a solution of pure dry tannin. The addition of sulphuric acid greatly aids the precipitation. The solution of gelatin is run into the tannin solution, stirring continually. As long as tannin is still present in certain quantity the precipitation goes on easily, but towards the end it is well to accelerate it by gently warming. In certain cases, in spite of the temperature and the acidity of the liquid, the tannate of gelatin is not completely deposited, and the persistent cloudiness prevents correct observation. In this case a part of the liquid is filtered from time to time in a funnel for rapid filtration, and returned to the bulk of the liquid as long as the addition of a drop of the gelatin solution produces cloudiness in the clear filtrate.—Chem. News, August, 1881, p. 81; from Jour. de Phar. et de Chim.

Tannin—Estimation.—In the Annual Report of the Commissioners of Agriculture for 1880 the volumetric process of Estcourt, as modified by Löwenthal, is recommended as having given the most satisfaction. This method depends upon the oxidation of a tannin solution by an acid permanganate solution, a definite amount of indigo being added to serve as indicator in the titration. Some experiments, made to verify the reliability of the process, are given, for which see "New Rem.," June, 1882, pp. 185–186.

Tannic Acid—Determination.—Mr. Lehman takes a quantity of the sample supposed to contain from 2 to 6 decigrams of tannic acid. It is exhausted with boiling water, and the liquid is concentrated down to 100 or 200 c.c. of filtrate. To 20 c.c. of this solution are added 20 c.c. of a saturated solution of ammonium chloride. The presence of this salt renders the separation of the precipitate both rapid and very distinct. Volumetric solution of gelatin is now carefully added, and the flow is stopped as soon as a precipitate no longer forms. To find the exact moment when the tannin is entirely precipitated, a small quantity of the liquid is filtered, and the filtrate is tested upon a watch-glass with solution of gelatin and with the solution of the sample. It should give no precipitate with either. The gelatin solution is standardized previously with a solution of pure tannin.—New Rem., May, 1882, p. 150; from Jour. de Phar. et de Chim., September, 1881, through Chem. News.

Tannin.—Compound with albumen as a corrective of unpleasant effects, see *Albuminoids*, under "Organic Chemistry."

Tannate of Lead—Preservation.—This compound, prepared according to the German Pharmacopœia, in a short time acquires an acetous odor in consequence of the oxidation of the alcohol. If, however, the latter is replaced by an equal quantity of glycerin, the gelatinous tannate keeps very well and may even easily be mixed with lard or with cerate.—Am. Jour. Phar., June, 1882, p. 207; from Jour. Phar. d'Alsace-Lorr., March, 1882, p. 50.

Quebrachitannic Acid—Preparation and Characters.—Quebrachitannic acid, according to P. N. Arata, is best prepared from the so-called gum of the Quebracho colorado, *Quebrachia* (*Loxopterygium*) *Lorentzii, Grisebach.* The gum is purified by treatment with alcohol, then dissolved in boiling water, and the hot filtered liquid set aside, the reddish deposit is collected on a filter, the mother liquor precipitated by a mineral acid or by table salt, and the precipitates are rapidly washed, pressed between bibulous paper and dried over sulphuric acid. The tannin is pale red, amorphous, yields a cinnamon-colored powder, is readily colored darker by alkalies, or by prolonged boiling of its solution, has an astringent taste, and is insoluble in carbon bisulphide, chloroform, oil of turpentine, and benzene. Its aqueous solution yields white precipitates with gelatin, albumen, alkaloids and lead salts, the latter, on heating, acquiring a rose and then a chocolate color; with ferric chloride, a green liquor is produced, changing to dark red, and on the addition of sodium acetate, to black. On dry distillation the tannin yields catechol; strong nitric acid converts it into oxalic and picric acids, and by fusion with potassa it is resolved into phloroglucol and protocatechuic acid. The tannin contains C 52.52, H 5.11.

Quebrachicatechin, extracted by ether from the mother liquor from which quebrachitannin has been precipitated, is freely soluble in alcohol and ether, sparingly soluble in hot water, gives rose-colored precipitates with basic lead acetate and with mercurous nitrate; blackish with a mixture of ferrous sulphate and sodium acetate; reduces silver nitrate and gold chloride; is colored yellow by nitric acid, red by sulphuric acid, yellowish by sodium hypochlorite, green by Fehling's solution; does not precipitate gelatin or the alkaloids.—Jour. Chem. Soc., December 1881, p. 1152; from Anal. Soc. Cient. Argent., 1879.

Gallic Acid—Solubility in Solution of Citrate of Potash.—Mr. F. Long has found that solution of citrate of potash is an excellent solvent for gallic acid, 15 grains of which form a clear solution in 1 ounce of water and 20 grains of the citrate.—Chem. and Drug., September, 1881. p. 396; from Brit. Med. Jour.

Pyrogallic Acid—Permanent Aqueous Solution for Photographers.—This is recommended by Wortley to be made of salicylic acid 1, pyrogallic acid 10, and water 1000 parts.—Am. Jour. Phar., January, 1882, p. 16; from Chem. Ztg., 1881, p. 692.

ORGANIC BASES.

Alcamines—A New Class of Bases.—Professor A. Ladenburg gives the name "alcamines" to an entire class of bases, which, like atropine, possess the property of becoming etherified in a hydrochloric solution, yielding, like tropine, ethers, which are always bases, and which approach the natural alkaloids, both in their properties and their composition. These new bases fulfil a double function, that of an alcohol and an amine. They are formed by the action of the chlor-hydrides on the secondary amines. Professor Ladenburg has prepared and examined piper-ethyl-alcamine, `tri-ethyl-alcamine, di-allyl-ethyl-alcamine, di-piper-allyl-alcamine, and piper-propyl-alcamine.—Chem. News, September 30, 1881, p. 169; from Compt. Rend., August 16, 1881.

Alkaloidal Principles—Extraction by means of Oxalic Acid.—Dr. P. E. Alessandri gives methods for the extraction of certain alkaloidal principles by means of oxalic acid. Processes are given for the preparation of *cascarilline*, *veratrine*, and *columbine*.—which see further on.—and for the assay of *cinchona* and *opium*, which see, under "Materia Medica."

Alkaloids—Estimation as Picrates.—Hager recommends the gravimetric estimation of alkaloids by a solution of picric acid, saturated at ordinary temperatures. The alkaloids are preferably employed as sulphates in moderately acid solution. The precipitation should be effected below 15° C. 1 gram of nicotine sulphate requires at least 300 c.c. of the picric acid solution, and about 150 c.c. of the latter are necessary for 1 gram of sulphate of a cinchona alkaloid. Coniine, aconitine, atropine, veratrine, codeine, strychnine, morphine and others are not adapted for estimation in this manner; but reliable results are obtained with nicotine, brucine, berberine and the cinchona alkaloids.—Am. Jour. Phar., February, 1882, p. 58; from Phar. Centralhalle. 1881. pp. 399, 400.

Alkaloids—Estimation by Iodohydrargyrate of Potassium.—Professor Albert B. Prescott communicates the results of some determinations of the percentages of iodine and mercury, in the iodomercurates of several alkaloids, namely, *strychnine*, *morphine*, *quinine*, and *berberine*. The analyses were done by Messrs. Frank E. Jackson and Charles E. Payne, and differed a little from the method communicated by Mr. Thomas B. Groves in 1859 (see Amer. Jour. Pharm., xxxvi, p. 535). The analysis of the *strychnia precipitate* gave results, which raise the question whether the iodomercurate of strychnia, as a precipitate, may not be in some degree complex and variable. This precipitate is one of the least soluble of the iodomercurates. The end of the reaction is distinct, and the precipitate settles fairly in acidulated water, but better in a concentrated solution of chloride of potassium. It consists mainly, and may consist wholly, of double iodide of the formula $C_{21}H_{22}N_2O_2HIHgI_2$. The quantity of strychnine calculated from this formula is 36.47 per cent.; the results of Groves indicated 33.03 per cent., whilst those of Judson and Payne gave 39.66 per cent. strychnine.

As regards the precipitation of *morphine* as iodomercurate the author regards as well established that, when the dilution is 200 parts of acidulate solution for 1 part of alkaloid, each c.c. of Mayer's solution precipitates very nearly 0.020 of morphine crystallized, or 0.019 of morphine anhydrous. This is the original factor given by Mayer, and is sustained by Kubly and Dragendorff. Professor Prescott has found the ratio of 0.020 to 1 c.c. to come near to the quantity of crystallized morphine taken, but that it is apt to fall a little below. Messrs. Judson and Payne obtained results which indicate 39.04 per cent. of morphine. The quantity calculated from the formula $(C_{17}H_{19}NO_3)_4(HI)_4(HgI_2)_3$ gives 37.82 per cent. The *quinine precipitate* was found to contain 31.94 per cent. of quinine. This does not agree with the ratio of 0.0108 to 1 c.c. of Mayer's solution, as usually stated. In former experiments, made by Messrs. Johnston and Lobb the percentage of quinine was still higher., viz., 33.01 per cent. The *berberine precipitate* contained as a mean of three analyses 52.10 per cent. of alkaloid. —Chem. News, March 17, 1882, pp. 114–115, and March 24, 1882, pp. 123–125; from Am. Chem. Jour.

Morphia—Complex Function.—P. Chastaing had previously shown that morphia dissolved in lime and soda solutions in equivalent proportion (Répert. de Phar., January and February, 1881, p. 15 and 86). He now finds that it dissolves in alkalies generally, equivalent for equivalent. The product of the solution is very unstable; it becomes colored, and at the end of a certain time assumes a tint as dark as that of solution of extract of opium. If care be taken to avoid the action of the atmosphere upon the alkaline solution, there is obtained by evaporation in a sulphuric vacuum (in the presence of lime, to avoid any trace of carbonic acid) a product that is very distinctly crystalline and scarcely colored. The compounds thus obtained are easily decomposable, and less stable than true salts. It is, however, incontestable that the bodies obtained represent definite substances, and that these properties of morphia answer to those of a phenol, and not to those of a true acid. Morphia is, therefore, a phenol, a function which confirms the reaction of perchloride of iron. The author has obtained, by crystallization *in vacuo*, both

Morphinate of Potash and *Morphinate of Baryta.*—The composition of these salts is represented by the formulas $C_{34}H_{19}NO_6KO$ (or BaO) $+ 2HO$. The barium compound crystallizes more readily than the compound of potash, but is more easily decomposable by the carbonic acid of the atmosphere.

Morphinate of Lime was obtained in two different conditions. One, $C_{34}H_{19}NO_6CaO + 4HO$, was probably not dry. The other appeared to be $C_{34}H_{19}NO_6CaO + 2HO$.—Phar. Jour. Trans., July 16, 1881; from Rép. de Phar., June, 1881, p. 268.

Morphine—Conversion into Codeine.—Various reactions of morphine, such as its reducing properties, solubility in carbonate of potash, lime, and baryta water, as also its coloration with iron salts, induced Mr. Grimaux to view this alkaloid as a phenol, of which codeïne should be the methyl-ether. This view was confirmed by experiment. By heating together 1 mol. of morphia, dissolved in alcohol with 1 mol. of soda, and 2 mol. of iodide of methyl, he obtained a body which corresponded in all its characters with the body obtained by the addition of codeïne to iodide of methyl; and by using only one-half as much iodide of methyl, he obtained codeïne, which was absolutely identical in all of its characters with that naturally contained in opium. If iodide of ethyl is substituted for the methyl compound, a

New Base, homologous with codeïne, is obtained instead, to the amount of 40 or 50 per cent. of the morphine used. The new base has the composition $C_{19}H_{23}NO_3$. It crystallizes with 1 mol. of water in handsome, hard, glistening scales, which are somewhat less soluble in boiling water than codeïne, but readily in ether and in alcohol.—Arch. d. Phar., September, 1881, p. 233; from Jour. de Phar. et de Chim., (5), iv., p. 16.

Methyl-ether of Morphine—Isomerism with Codeine.—Dr. O. Hesse, referring to Mr. Grimaux's results, states that he has long ago obtained by the action of iodide of methyl on morphia-potassium a compound which he expected to be codeïne, but which proved to be only an *isomer*. He has now repeated the experiment, following the directions of Grimaux, and obtained besides the isomer previously observed by him, which he proposes to name *β Methyl-morphia*, about an equal quantity of a substance that had great similarity with codeïne. He proposes for this the name *a* methyl-morphia, and finds that it differs only in its optical behavior from the natural alkaloid codeïne. He does not agree with Mr. Grimaux that these bodies should be distinguished by the general name "codeia," but that their characters as ethers of morphia should be taken into account in their nomenclature. —Phar. Jour. Trans., August 20, 1881, p. 157.

Mr. D. B. Dott, after reviewing the observations of Messrs. Grimaux and Hesse, describes some experiments made with both methods, and arrives at the conclusion that the *α* methyl-morphia (obtained by Grimaux's method) and the *β methyl-morphia* of Hesse are identical substances, and that both are, as believed by Grimaux, artificial codeïne, having all the properties, except the optical, in common with the natural alkaloid. Moreover, that, as also found by Grimaux, the rotatory power of the artificial substance does not differ very greatly from that of codeïne, and may be accounted for by slight impurity. On the other hand, he agrees with Mr. Hesse that the ethers of morphine should not be called "codeïnes," such being liable to lead to confusion.—Ibid., June 10, 1882. p. 1009.

In consequence of the above remarks of Mr. Dott, Mr. O. Hesse communicates the results of his researches made since his above paper was published. He has now also found that the substance which he named *α methyl morphine* is identical with codeïne, and the slight optical differences formerly observed do not exist when the hydrochlorate has been purified by several crystallizations. The substance named by him *β methyl-morphine* is, however, a distinct body, namely, *Dimethyl morphine*, whilst *α methyl morphine* is *mono-methyl-morphine*. Under certain conditions, when operating by his original process, only traces of the latter product (codeïne) are formed, his first-described compound being almost exclusively produced. The two methyl-ethers are two well-characterized substances, the relations of which to morphine are given by Dr. Hesse as follows:

$$\text{Morphine, } C_{17}H_{17}NO \left\{\begin{array}{l} OH \\ OH \end{array}\right.$$

$$\left.\begin{array}{l}\text{Mono-methyl-morphine,}\\ \alpha\ \text{methyl-morphine,}\\ \text{Codeïne,}\end{array}\right\} C_{17}H_{17}NO \left\{\begin{array}{l} OH \\ OCH_3 \end{array}\right.$$

$$\left.\begin{array}{l}\text{Dimethyl-morphine,}\\ \beta\ \text{Methyl-morphine,}\end{array}\right\} C_{17}H_{17}NO \left\{\begin{array}{l} OCH_3 \\ OCH_3 \end{array}\right.$$

Ibid., June 17, 1882, p. 1029.

Morphine—Detection of Small Quantities.—A. Jorissen recommends that the solution of morphia, free from foreign bodies, be evaporated to dryness, and the residue heated on the water-bath with a few drops of sulphuric acid. A minute crystal of ferrous sulphate is then added, bruised with a glass-rod, stirred up in the liquid, heated for a minute longer, and poured into a white porcelain capsule, containing 2 to 3 c.c. of strong ammonia. The morphia solution sinks to the bottom, and where the liquids touch there is formed a red color, passing into violet at the margin, whilst the ammoniacal stratum takes a pure blue. The reaction is distinct to 0.0006 gram. Codeïne does not give this reaction. If sulphuric acid at 190° to 200° is allowed to act upon morphia, there is ultimately formed an opaque black-green mass. If this is poured dropwise into much water, the mixture turns bluish, and if it is then shaken up with ether or chloroform, the former takes a purple and the latter a very permanent blue. Codeïne gives the same reaction, but no other of the alkaloids. This reaction can be obtained very distinctly with 0.0004 gram of morphine.—Chem. News, February 3, 1882, p. 57, from Zeitschr. f. Anal. Chem., xx., No. 3.

Morphia Salts—Solubility in Water and Alcohol.—Professor J. U. Lloyd has determined the solubility of the officinal salts of morphia in water and in alcohol to be as follows:

Acetate of Morphia.—1 part is soluble in 11.70 parts of water at 60° F.; in 1.34 parts of boiling water; in 68.30 parts of alcohol at 60° F., and in 13.30 parts of boiling alcohol.

Hydrochlorate of Morphia.—1 part is soluble in 23.40 parts of water at 60° F.; in 0.51 parts of boiling water; in 62.70 parts of alcohol at 60° F., and in 30.80 parts of boiling alcohol.

Sulphate of Morphia.—1 part is soluble in 21.60 parts of water at 60° F.; in 0.75 parts of boiling water; in 701.50 parts of alcohol at 60° F., and in 144.00 parts of boiling alcohol.

The alcohol had the specific gravity of 0.820. All parts are understood to be by weight. For the particulars of the methods whereby these solubilities were ascertained, see New Rem., May, 1882, p. 135.

Sulphate of Morphine—Solubility in Water.—The question of the solubility of sulphate of morphine in water at the ordinary temperature is one which one would think should have been settled long ago. Yet the statements in works of authority are so conflicting as to give rise to considerable confusion. Professor Frederick B. Power, with a view to settling the question definitely, has made some experiments which show that the solubility of the crystallized salt may vary between 1 part in 21.44 and 1 part in 23.99 parts of water at 15° C. (= 59° F.). The former result was obtained by evaporating a solution of the salt saturated at 15° C., heating at 130° C. to constant weight, and calculating the quantity of crystalline salt dissolved from the weight of the anhydrous residue. The latter result was obtained by the method of Victor Meyer, which consists in precipitating the saturated solution with chloride of barium, and, from the amount of ignited sulphate of barium inversely calculating the amount of crystallized sulphate of morphine $(C_{17}H_{19}NO_3)_2.H_2SO_4 + 5H_2O$. Closely corresponding results were obtained by the latter method both in cold saturated solutions, made cold and made by the aid of heat, and allowing the excess of morphine to crystallize out, and Professor Power, therefore, considers it safe to assume that 1 part of morphine requires, in round numbers, 24 parts of water at 15° C. (= 59° F.) for solution.—Amer. Jour. Phar., March, 1882, pp. 97–99.

Hydrobromate of Morphia—Advantages over the Hydrochlorate.—Dr. Landrieux ("La France Medicale") employs this salt in solution to one-fiftieth, and injects from 5 to 10 and 20 milligrams a day. More soluble than the hydrochlorate of morphia, it may be used in half doses, is more sedative, and does not give rise to the sort of purulent diathesis frequent after repeated injections of hydrochlorate.—Amer. Jour. Pharm., August, 1881, p. 424; from Chicago Med. Review.

Macleyine.—A new alkaloid from *Macleya cordata*, R. Br., which see, under "Materia Medica."

Cinchona Alkaloids.—In a former paper (Ber. d. d. Chem. Ges., xiv., 1685), Dr. O Hesse had pointed out that the *hydrocinchonidine* of Forst and Bohringer was probably identical with the alkaloid to which he had given the name

Cinchonidine.—Further experiments have made this view almost a certainty, the only remaining distinction being the respective formulas. This difference may, however, be of no importance, since the formula given for hydrocinchonidine is not based upon absolute analysis. It appears, furthermore, that this new base is contained in varying quantities in commercial cinchonidine from different sources.

The fact that the author was able to obtain the alkaloid in question very easily from commercial cinchonidine, induced him to test cinchonia, conchonine (quinidine), and quinine in the same direction. With cinchinine this investigation did not yield any satisfactory results, which he believes is attributable to the fact that in the cinchona barks used by him in the preparation of quinine, cinchonia, etc.,

Hydrocinchonine, or the base resisting the action of permanganate of potassium, occurs at most only in traces. On the other hand, hydrocinchonine was contained in a bark described as "China cuprea," but which was not suited for the manufacture of quinine, etc. The composition of this base corresponds to the formula $C_{19}H_{24}N_2O$. Its properties do not correspond to those which Caventou and Willm, as well as Skraup have given, the differences being in the melting-point and in the composition of the chloroplatinate. Further investigations are necessary.

From the mother liquors of the sulphates of cinchonine and quinine the author separated fractions which were rich in hydroconchinine and hydroquinine respectively.

Hydroconchinine (Hydroquinidine) was found to have a composition corresponding to the formula $C_{20}H_{26}N_2O_2+2\frac{1}{2}H_2O$. It forms readily efflorescing prisms, which melt at 168° C. (uncorr.) and dissolve freely in hot alcohol and chloroform and less freely in ether. The solution of the base in dilute sulphuric acid shows a blue fluorescence, whilst in a solution in hydrochloric acid this property could not be observed. These solutions, upon the addition of chlorine and ammonia in excess, gave a dark-green color. The neutral sulphate crystallizes in delicate colorless crystals, which have a great resemblance to the crystals of sulphate of conchinine.

Hydroquinine, dried at 120° C., has a composition corresponding to the formula $C_{20}H_{26}N_2O_2$. The alkaloid melts at 168° C. (uncorr.). dissolves freely in alcohol and ether, and upon the evaporation of the solution is left behind in an amorphous form. It exhibits with chlorine and excess of ammonia the same reactions as quinine, but resists the action of permanganate of potassium for a longer time. The neutral sulphate $(C_{20}H_{26}N_2O_2)_2.SO_4H_2+H_2O$, crystallizes in colorless needles, sparingly soluble in cold water. The neutral tartrate, while sparingly soluble, is more soluble than the neutral tartrate of quinine.

The author, furthermore, draws attention to two other cinchona alkaloids, *homoquinine* and *cincholine*.

Homoquinine, which was found simultaneously in cuprea bark by D. Howard and J. Hodgkin, B. H. Paul and A. J. Cownley. and G Whiffen, was observed as far back as 1880, by Mr. J. A. Tod. who furnished the material for the present investigation. The substance, when purified by repeated crystallizations from ether, and dried at 120° C., has a composition corresponding to the formula $C_{19}H_{22}N_2O_2$. It crystallizes from ether containing water, partly in flat prisms (containing 2 mol. water) and partly in laminæ (apparently containing 1 mol. water). It melts at 177° C. (uncorr.). dissolves freely in alcohol and chloroform, sparingly in ether. It dissolves in dilute sulphuric acid with blue fluorescence, and with chlorine and excess of ammonia is colored exactly the same as quinine. It forms easily crystallizable salts with several acids. The crystals of the neutral tartrate are sparingly soluble in cold water, and those of the neutral sulphates very sparingly.

Cincholine is obtained from the mother liquor of the preparation of sulphate of quinine, as a pale-yellow oil. having a strong basic reaction, lighter than water, and with a faint peculiar smell. It dissolves freely in ether, alcohol, and chloroform, less so in water, and scarcely at all in soda solution. It can be distilled, especially in the vapor of water, is not colored by chloride of lime, and dissolves freely in hydrochloric acid, which it is capable of neutralizing. The neutral hydrochlorate is tasteless, and forms colorless, mostly four-sided, scales. The oxalate is very sparingly soluble in water. In a future paper the author will speak of the composition of cincholine, which may, perhaps, play some part in the formation of quinine.—Phar. Jour. Trans., May 6, 1882, pp. 904–906; from Ber. d. d. Chem. Ges., xv., p. 854.

Cinchona Alkaloids—Estimation.—See *Cinchona Bark*, under "Materia Medica."

Quinetum—(The Mixed Alkaloids of Red Bark, see Proceedings, 1877, p. 306)—Preparation.—The following formula has been adopted by the Dutch Society for the Advancement of Pharmacy: Red Cinchona bark (the bark of the trunk of *Cinchona succirubra*, grown in Java or India, and containing at least 6 per cent. of alkaloids), in fine powder, 1000 parts; normal hydrochloric acid (volumetric standard), 1000 parts; oxalic acid, 12 parts; solution of soda, q. s.; water, q. s.

Macerate the cinchona with the hydrochloric acid and 3000 parts of water for at least 12 hours, occasionally stirring. Pour the mixture into a percolator, the lower orifice of which is closed by a linen plug, and, as soon as the liquid runs off clear, displace with water until the liquid running from the percolator is no longer precipitated (though it may be colored) by solution of soda.

To the strained liquid (which may amount to perhaps 8000 parts) add the oxalic acid dissolved in a little water, and then add *carefully*, under continued stirring, just enough solution of soda until the precipitate which forms at first separates in coherent flakes. Separate this precipitate (which consists of oxalate of calcium and cinchona-red) by pouring off as much of the still acid clear liquid as is possible, and filter the remainder. To the united liquids add now an excess of solution of soda, let it settle, and collect the precipitate upon a moistened double filter. Wash it with a weak soda solution until the washings have only a light-red color; then wash with the least possible quantity of water, until the washings begin to have a bitter taste. Let the precipitate drain, dry it in the air, and powder it.

Quinetum is completely soluble in strong, warm alcohol. When 3.1 grams of quinetum are dissolved in 10 c.c. of normal hydrochloric acid, this solution must be clear, and, on the addition of 2 grams of Rochelle salt, must yield a precipitate which, when dried, should amount to *at least* 65 per cent. of the weight of the quinetum dissolved.

Quineti Boras—Borate of Quinetum, Soluble Quinetum.—Quinetum, 1; boric acid, 2; distilled water, 10. Dissolve the acid in the water by heat, and add the quinetum gradually to the solution. Filter if necessary, evaporate to dryness on a water-bath, and reduce the mass to powder.

A very pale-yellow powder, completely soluble in water, and of an alkaline reaction.—New Rem., January, 1882, p. 10.

Indian Quinine and Cinchona Febrifuge.—It is announced that Dr. King, in charge of the Government cinchona factory at British Sikkim, has succeeded in manufacturing, for the first time in India, sulphate of quinine from local cinchona bark. The samples produced are said to bear comparison, on analysis, with the pure sulphate of quinine of commerce, and preparations are being made for undertaking the manufacture on a large scale. According to the recent report of the Government quinologist for 1880–81, the factory at Darjeeling disposed of 8600 pounds of febrifuge during the year, and harvested a crop of 348.560 pounds of bark. The earnings for the year amounted to 80,290 rupees, giving a dividend of 8 per cent. on the capital of the plantation, exclusive of the saving to Government of 4½ lakhs of rupees, through the substitution of the febrifuge for quinine in the public hospitals.

At the Government cinchona factory in British Sikkim, a new product, which claims to be an improvement on the cinchona febrifuge, is a "crystalline febrifuge." The peculiarity of this preparation is that it consists of the mixed sulphates of the crystallizable alkaloids only. By rejecting those that are not crystallizable it is expected that the nausea which sometimes follows the taking of the febrifuge will also be eliminated.—New Rem., April, 1882, p. 103.

Artificial Quinia.—It is announced in a recent number of the "Comptes Rendus" of the French Academy, that Mr. E. J. Maumené has succeeded in the synthesis of quinia by a simple and easy process, and that he has deposited with the Academy a sealed package describing his process and containing a specimen of the artificial alkaloid. Therapeutic experiments with the artificial substance are still unfinished, but very soon the alleged discoverer will publish detailed statements and evidences of his results.—"Ephemeris," No. 3, 1882, p. 85.

Quinine—Quantitative Estimation as Herapathite.—Mr. A. Christensen has undertaken experiments with a view of determining the conditions under which the estimation of quinine as herapathite would yield accurate results. He sums up his results as follows:

1. Acidulated spirit dissolves a notable quantity of herapathite. Too much and too little acid are alike disadvantageous.

2. The concentration of the solution can affect the result.

3. If cinchonidine is present in at all large quantity, periodosulphate of that alkaloid may be precipitated in spite of the precautions recommended by De Vrij.

4. Quinine iodo- compounds are formed richer in iodine than herapathite unless the solutions are cold and the filtration takes place one hour after precipitation. To avoid the precipitation of iodosul-

phate of cinchonidine, the author proposes the separation of quinine by ether as far as possible before precipitation.—Phar. Jour. Trans., November 26, 1881, p. 441; from Phar. Zeitschr. f. Russ., xx., p. 581.

Quinine—Quantitative Estimation as Herapathite.—The above observations of Mr. Christensen have induced Dr. De Vrij to make some further experiments, whereby he has confirmed his previous results completely. Operating with a known quantity of sulphate of quinine, he obtained a quantity of herapathite which very closely corresponded to the theoretical quantity of alkaloid (74.86 instead of 74.31 per cent.). notwithstanding that he had boiled the mixture after the addition of a slight excess of the reagent, and had allowed the same to stand after cooling for twelve hours before collecting the crystals. The herapathite obtained was analyzed by Dr. A. C. Oudemans, who found it to contain 21.55 per cent. of iodine loosely combined; the formula requiring 21.7 per cent. In view of these results, and of his past experience, Dr. De Vrij believes himself justified in maintaining his conviction that the iodosulphate of chinioidine, *if well prepared and well applied,* is the best reagent actually known, not only for the qualitative, but also for the quantitative estimation of quinine. Although the author retains the principle, an experience of more than six years has led him to make some slight changes in its application, for which reason he communicates his actual manipulation, as follows:

1. *Preparation of the Iodosulphate of Chinioidine.*—One part of commercial quinoidine is heated on a water-bath with 2 parts of benzol whereby the quinoidine is partly dissolved. The cold clear benzol, solution is shaken with an excess of weak sulphuric acid, whereby a watery solution of acid sulphate of chinioidine is obtained. After ascertaining in a small part of this solution the amount of amorphous alkaloid contained in it, the clear solution is poured into a large capsule, and for every 2 parts of amorphous alkaloid 1 part of iodine and 2 parts of iodide of potassium are dissolved in water. This solution is *slowly* added *under continuous stirring* to the liquid in the capsule, so that no part of it comes in contact with an *excess* of iodine. By this addition an orange-colored flocculent precipitate of iodosulphate of chinioidine is formed, which either spontaneously or by a slight elevation of temperature collapses into a dark brown-red colored resinous substance, whilst the supernatant liquid becomes clear and slightly yellow-colored. This liquor, which, if the prescription is strictly followed, *must* still contain some amorphous alkaloid, as a proof that no excess of iodine has been used, is poured off and the resinous substance is washed by heating it on a water-bath with distilled water. After washing, it is heated on a water-bath till all the water is evaporated, and then constitutes a soft tenacious mass, which be-

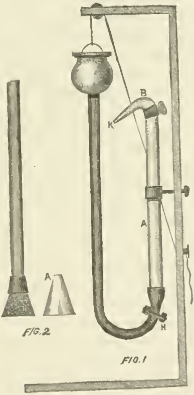
comes hard and brittle on cooling. 1 part of this substance is now heated with 6 parts of 92 to 95 per cent. alcohol on a water-bath and the solution allowed to cool, whereupon a part of the dissolved substance is separated. The clear dark brown-red solution is evaporated on a water-bath and the residue dissolved in 5 parts of *cold* alcohol. This second solution leaves a small quantity of insoluble substance. The clear dark brown-red solution constitutes the reagent, which the author has hitherto used under the name of "iodosulphate of chinioidine," both for the qualitative and quantitative determination of *crystallizable* quinine in barks.

2. *Application of the Reagent* —To determine the quantity of quinine contained in the mixed alkaloids obtained from a cinchona bark, 1 part (say 1 gram) of these alkaloids is dissolved in 20 parts of alcohol of 92 or 95 per cent., containing 1.5 per cent. of H_2SO_4, and this solution is diluted with 50 parts of pure alcohol. From this solution the quinine is separated *at the ordinary temperature* by adding carefully, by means of a pipette, the above-mentioned solution of iodosulphate of chinioidine as long as a dark brown-red precipitate of iodosulphate of quinine (herapathite) is formed. As soon as all the quinine has been precipitated, and a slight excess of the reagent has been added, the liquor acquires an intense yellow color. The beaker containing the liquor with the precipitate is now covered by a watch-glass, and heated till the liquid begins to boil and all the precipitate is dissolved. The beaker is then left to itself, and in cooling, the herapathite is separated in the well-known beautiful crystals. After twelve hours' rest, the beaker is weighed to ascertain the amount of liquid, which is necessary in order to be able to apply later the necessary correction, the herapathite being very slightly soluble in cold alcohol. The clear liquid is poured off as far as possible on a filter, leaving the majority of the crystals in the beaker, which is now weighed again to ascertain the amount of liquid, which is noted down. The few crystals on the filter are now washed down in the beaker, and as much alcohol added as is necessary to redissolve all the crystals at the boiling-point. The object of this redissolving is to be absolutely certain that by surface attraction no trace of iodosulphate of cinchonidine has adhered to the crystals of herapathite. After perfect cooling, the weight of the beaker is ascertained again, the crystals of herapathite carefully collected on a small filter, and the empty beaker again weighed. The difference in weight will indicate the amount of liquor which is added to that of the first liquor, and from the sum of this addition the necessary correction is calculated. If the operation is effected at a temperature of 16° C., the weighed quantity of the two liquors will indicate the correction if multiplied by 0.125 and divided by 100. If the temperature be lower or higher, the solubility of herapathite at that

temperature must be ascertained by experiment, which can be easily performed by a standard solution of hyposulphite of sodium, as 21.58 parts of iodine found by this reagent indicate 100 parts of herapathite. The herapathite collected on the filter is thoroughly washed with a saturated alcoholic solution of pure herapathite, and after this washing is completed the liquid retained by the crystals is expelled as much as possible by slightly knocking the side of the funnel. The filter is then taken from the funnel and laid upon blotting-paper, often renewed, to take away as quickly as possible the still adhering liquid. As soon as the filter is air-dry, the crystals of herapathite can be completely removed from the filter and dried on a water-bath in one of a couple of large watch-glasses closing tightly upon each other, so that the weight of the substance contained in the glass may be taken without the access of the air. If, after repeatedly weighing, the weight remains constant, it is noted, and to it is added the product of the calculated correction. The sum of this addition is the total amount of iodosulphate of quinine obtained from the mixed alkaloids subjected to the operation, and from this weight the amount of quinine can be calculated by the use of Jörgensen's formula: $4C_{20}H_{24}N_2O_2,3H_2SO_4,2HI.I_4$. According to this formula 1 part of herapathite dried at 100° C. represents 0.55055 parts of pure anhydrous quinine.—Pharm. Jour. Trans., January 21st, 1882, pp. 601–603.

Quinine—Estimation in Tinctures, Wine, etc.—Mr. A. Wynter Blythe has experimented in order to determine the most accurate and expeditious process for determining the quinine in quinine wine, tinctures, etc. *Mayer's reagent* gave very fair results, but is rather tedious. To facilitate the process he employs the simple mechanism, shown in the accompanying cut (Fig. 63), which he calls a filter-tube. It is constructed by enlarging the end of a glass tube to a funnel shape and cutting it off at *A*; cram it with glass-wool and slip it on to the end of another tube by means of rubber. By the aid of this filter-tube a clear drop of liquid can be sucked up, and by placing this clear drop on a black plate, the addition of a droplet of the reagent at once shows if the quinine has all separated or not. In the case of wines and the like, however, it is very difficult, and hence tedious, to secure a clear drop. *Scheibler's reagent* is also accurate, but does not compare favorably, in respect of time, with the *ether and alkali process*. In order to make this old-fashioned process expeditious and accurate, Mr. Blythe devised a new tube (Fig. 2), which has since been found most useful, and, in fact, indispensable, for the separation, quantitatively, of volatile solvents when used for the recovery of substances from liquids. The tube *A* (Fig. 1) may be of any convenient length or diameter to suit the analyst (ordinarily, burette size will do). It is furnished with a stopcock and bent beak, *B*, of small, almost capillary bore. The lower end is attached to a long piece of pressure-tubing, which is also connected with a long reservoir of mercury capable of being raised or lowered by a pulley. To use the apparatus raise the reservoir, after opening the stopcock, until mercury flows out at *K*. Now insert the point of the outlet-tube, *K* into the liquid to be examined, and, by lowering the reservoir cause a vacuum, so as to suck the liquid into the tube. The ether is introduced in exactly the same way. Now run all the mercury, or nearly all of it, out of the tube, and clamp the pressure-tubing at *H*, and also shut the stopcock at *B*. The tube and contents may now be violently shaken. After standing, the ether separates in a defined layer. The stopcock and clamp are now opened while raising the reservoir. The ether is made, even to the last drop, to flow out of *K* into the tared flask, from whence it is recovered by distillation. The residual quinine is dried in the usual manner and weighed; its weight, multiplied by 1.3, gives the corresponding weight of sulphate of quinia in common use, *i. e.*, having the formula $(C_{20}H_{24}N_2O_2)H_2SO_4, 7H_2O$.

FIG. 63.



Apparatus for Estimation of Quinine.

Wines and tinctures freed from most of their spirit in this way were exhausted of quinine very rapidly by three times shaking with ether, previously making the liquid strongly alkaline by soda. At first a woolliness at the junction of the ether and the wine gave much trouble, but it was found that by using a large excess of soda the line between the liquid and the ether became sharp and well-defined. Quinine is practically quite insoluble in strong soda lye.—New Rem., February, 1882, p. 35; from "The Analyst," September, 1881.

Quinine Salts—Tests of Purity.—The contamination of a sample of muriate of quinia of reputable manufacture with cinchonidine, induced Mr. C. H. Wolff to subject samples of different manufacture to examination, and led him also to subject the different methods for determining the purity of quinine salts to critical comparison. He found those of Kerner (see Proceedings, 1881, p. 329) and Hesse (Ibid., 1879, p 499) to be the most reliable, while the microscopical methods of Schrage (Ibid., 1875, p. 409, and 1879, p. 488) and of Godeffroy (Ibid., 1878, p. 569) are not so reliable when taken by themselves, though when applied in conjunction with Hesse's method, they serve an excellent purpose for determining the character of the contaminant. For this purpose any crystals that may separate beneath the ethereal layer when applying Hesse's test are carefully removed (for which operation Mr. Wolff gives explicit directions), dissolved by the aid of a drop of 1 per cent. solution of sulphuric acid in a few drops of water, and the microscopic test is then applied, according to the directions of Schrage and Godeffroy.—Arch. d. Pharm., July, 1881, pp. 1–12.

Bisulphate of Quinia—Preparation.—The following formula has been adopted by the Dutch Society for the Advancement of Pharmacy: Sulphate of quinia (the officinal salt), 3 parts; dilute sulphuric acid (sp. gr. 1.113 to 1.117), 2 parts; distilled water, 12 parts. Dissolve the sulphate of quinia in the dilute acid mixed with the water, and evaporate the liquid, at a temperature of 30° to 40° C., to about one-half. Allow it to crystallize, collect the crystals in a funnel, let them drain, and dry them between blotting-paper. From the mother liquor another crop of crystals may be obtained in the same manner. From the final mother liquor the quinia may be thrown down by carbonate of sodium. The salt forms colorless, columnar crystals, efflorescent on exposure to air, soluble in alcohol and in 11 parts of water.—New Rem., January, 1882, p. 10.

Hydrochlorate of Quinine—Preparation.—Mr. R. Rother observes that when this salt is prepared by dissolving quinine in hydrochloric acid an excess of the latter is avoided with difficulty, and the solution, on evaporation, suffers a partial change. He regards the method of double decomposition between the sulphate and chloride of barium also as objectionable, and recommends the following as giving most satisfactory results: Place 500 grains of sulphate of quinia and 67 grains of dry and pure chloride of sodium in a flask of convenient size, or even in an ordinary capsule; then add 3 fluid ounces of strong alcohol and a quarter fluid ounce of water, and heat the mixture until the white magma has disappeared, and a semi-transparent, thin, gelatinous liquid is obtained. After this has cooled pour it upon a filter or strainer, wash the residue with sufficient alcohol, and evaporate the filtrate until most of the alcohol has vanished; then add about half an ounce of water; evaporate again until a dense, somewhat syrupy liquid remains. Pour this on a tile or glass plate, and expose the resulting crystals in the open air until dry.—The Pharmacist, January, 1882, pp. 10–13.

Hydrochlorate of Quinia—Peculiar Behavior.—Dr. Vulpius has observed that, under certain conditions, the formation of a precipitate on the addition of nitrate of silver to solutions of this salt is very materially retarded, and that, indeed, the precipitate may not form at all. If a 1 per cent. solution of nitrate of silver is added to 50 grams of a 1 per cent. solation of hydrochlorate of quinine, drop by drop, with constant agitation by giving the vessel a rotatory motion, the addition can be continued until 10 grams of the reagent have been added before a precipitate manifests itself. If, on the other hand, a more concentrated solution of the reagent is used, or if it is added to the hydrochlorate without stirring, a precipitate at once occurs. There seems a probability that, at the moment of contact, the hydrochlorate is capable of forming a double compound with nitrate of silver, which is soluble in water.—Arch. d. Pharm., May, 1882, p. 361.

Compound of Quinine and Quinidine—Formation, etc.—C. H. Wood and E. L. Barret, when working with cuprea bark, noticed that the ethereal solution of the total alkaloids extracted from it would frequently furnish a notable quantity of crystals that did not resemble those of any of the known cinchona alkaloids obtained under like circumstances. Further experiments proved these crystals to be a compound of quinine and quinidia, which, when converted into neutral sulphate, resolves itself into pure sulphate of quinine and sulphate of quinidia, the latter crystallizing from the mother liquor after the sulphate of quinine has crystallized out. The authors have, furthermore, determined that the formation of this new compound is not due to any peculiarity of these alkaloids from cuprea bark, but that the quinine and quinidine from South American yellow bark, and calisaya bark from India, will produce the same compound. The most convenient way to obtain the compound is to dissolve 1 part of pure quinine in 30 or 40 of ether, and adding to the liquid a saturated ethereal solution of a like quantity of quinidia. Upon mixing, a crystalline precipitate of the body forms in abundance; 100 c.c. of ether at common temperature dissolve only 0.5 gram of it. Further experiments are necessary to determine the exact constitution of the new compound, and may prove that the new alkaloid of cuprea bark (which see) is in reality identical with this.—Chem. News, January 6th, 1882, p. 6–7.

Ultra-Quinine—A new alkaloid in *Cinchona cuprea*, which see, under "Materia Medica."

Arsenate of Quinia—Preparation.—The following formula has been adopted by the Dutch Society for the Advancement of Pharmacy: Take of solution of arsenic acid (see under "Liquores"), 87 parts; boiling distilled water, 65 parts; quinia, 17 parts. Boil the mixture until everything is dissolved, filter, if necessary, and pour the liquid into a flat capsule. The salt contains 14.55 per cent. of arsenic acid, or 9.49 per cent. of arsenic, and constitutes white, shining needles, easily soluble in dilute acids, in 130 parts of cold water, 10 parts of boiling water, 188 parts of strong alcohol, and insoluble in ether.—New Rem., January, 1882, p. 10.

Herapathite—Use and Production prior to its Discovery by Herapath.—Dr. De Vrij, in connection with his paper on the estimation of quinine (which see above), draws attention to the interesting fact, that although by the discovery of Herapath in 1852, the beautiful compound of quinine with I and H_2SO_4 has been made generally known, it had already been described and therapeutically used by Bouchardat, who prescribed it to scrofulous patients suffering from obstinate fevers. He was, however, not acquainted with its real chemical formula, for he described it under the name of "Iodure d'iodhydrate de quinine."—Phar. Jour. Trans., January 21st, 1882, p. 603.

Neutral Tannate of Quinine.—The following formula has been adopted by the Dutch Society for the Advancement of Pharmacy: Sulphate of quinine, 1 part; diluted sulphuric acid, about 1 part; tannic acid, 4 parts; solution of acetate of ammonium, 3 parts; distilled water, q. s. Dissolve the sulphate of quinine in 70 parts of distilled water, with the aid of diluted sulphuric acid, avoiding an excess. Add to the solution the tannic acid, previously dissolved in 100 parts of distilled water, and afterwards the solution of acetate of ammonium, previously diluted with 8 parts of distilled water.

(The solution of acetate of ammonium is prepared by saturating water of ammonia (sp. gr. 0.956–0.960) with acetic acid (sp. gr. 1.051–1.055), about 9 parts of the latter being required for 10 parts of the former.)

Let the mixture stand for five hours, occasionally stirring. Collect the precipitate upon a filter, and wash it with small quantities of distilled water successively poured on, until a little of the precipitate removed from the filter, and dried, ceases to have a bitter taste. Then dry it by exposure to air, and rub it to powder.

The resulting tannate of quinine is a yellowish-white, odorless, and almost tasteless powder, containing 8 to 10 per cent. of water. and which should yield 19 to 21 per cent. of anhydrous quinine, when it is assayed by the following process:

Mix 1 part of tannate of quinine, in a test-tube, with 10 parts of solution of soda (of 6 per cent.). and warm the mixture on the water-bath for fifteen minutes. Add to it, when cold, 30 parts of chloroform, shake well, and transfer the whole to a separating-funnel. As soon as the chloroform has become clear, let 15 parts of it run out and evaporate this portion upon the water-bath to dryness. Then weigh the residue.

This residue, corresponding to a quantity of anhydrous quinine contained in one-half part of the tannate, when dissolved in a little water acidulated with sulphuric acid, then treated with 2 parts of ether and an excess of ammonia, should yield a clear liquid separating into two layers.—New Rem., June, 1882, p. 173.

Cinchonamine—A New Alkaloid from Cinchona "Cuprea."—Mr. Arnaud ascertained the presence of a new base,—identical in composition with hydrocinchonine, and which he proposes to name cinchonamine,—in a very dense bark, of a deep red-brown, with resinous fracture, coming from the province of Santander. This bark (cinchona cuprea) does not resemble that usually exported from those regions. The new base exists in this bark simultaneously with cinchonia. The proportion of these alkaloids is 0.8–1.0 per cent. of cinchonine and 0.2 per cent. of cinchonamine. In order to extract them, the bark is treated with milk of lime; the mixture, dried at the ordinary temperature, is exhausted by strong boiling alcohol; the latter is distilled off, and the residue taken up by an excess of dilute hydrochloric acid. The hydrochlorate of cinchonamine, but little soluble in the cold, crystallizes, while the hydrochlorate of cinchonine remains in solution. Upon this fact is based the method of separation.

Cinchonamine is insoluble in cold water. It crystallizes from the boiling alcoholic solution in colorless, brilliant, and anhydrous prisms; from the warm ethereal solution, or on spontaneous evaporation, it crystallizes in fine needles. One part of the alkaloid is soluble in 100 parts of ether, sp. gr. 0.720 at 17° C., and in 31.6 parts of alcohol of 90 per cent. It melts below 195° C., and on cooling, becomes a transparent amorphous mass. Its alcoholic solution has an alkaline reaction. It is dextrogyre, the angle of rotation for the solution in alcohol of 93 per cent. is $[\alpha]_D = +117.9°$. The solutions of its salts are precipitated by potassa and ammonia. It completely neutralizes acids, forming salts which are generally but little soluble. Its taste is slightly bitter. The salts in acid solution are not fluorescent.

The chlorhydrate, $C_{19}H_{24}N_2O.HCl\ H_2O$, crystallizes very easily in prisms or prismatic plates, but little soluble in cold water, much more so in water acidulated with hydrochloric acid.

The chloroplatinate $(C_{19}H_{24}N_2O.HCl)_2PtCl_4$, is a bright-yellow, crystalline powder, obtained by precipitating a salt of cinchonamine in acid solution, by an excess of platinic chloride. The precipitate is nearly insoluble in pure and in acidulated water.

The sulphate, dried at 100° C., $(C_{19}H_{24}N_2O)_2.H_2SO_4$, very soluble in water, crystallizes well from alcohol. By spontaneous evaporation of the alcoholic solution it is deposited in the form of an amorphous resin.

The nitrate, a crystalline precipitate, is nearly insoluble in dilute nitric acid.

The hydriodate and the acetate are very little soluble in cold water; they are likewise crystalline.

The sulphate is dextrogyre in acid solution, but the rotatory power of the alkaloid is greatly diminished, the angle of rotation being only $[\alpha]_D = + 45.5°$ at 16° C.—New Rem., January, 1882, p. 8; from Rép. de Phar., 1881, 507.

Aricine and Cusconine—Fresh Occurrence.—See *Cinchona Cuprea*, under "Materia Medica."

Purified Chinoidine—Preparation.—The following process has been adopted by the Dutch Society for the Advancement of Pharmacy: Commercial chinoidine, 1 part; benzol, 3 parts.

Digest the chinoidine while agitating or stirring with two parts of the benzol, on the water-bath. Pour off the clear solution, and wash the residue with the remainder of the benzol. Shake the united clear liquids with a small excess of dilute hydrochloric acid, remove the acid liquid, after settling, by a separating-funnel, and render it faintly alkaline by solution of soda. Examine a small sample for its purity, by adding to the clear diluted solution a few drops of concentrated solution of hyposulphite of sodium, whereby a precipitate must not be produced which does not disappear on further dilution with water. If this is the case, then the whole liquid must be purified by adding the hyposulphite until no longer a permanent precipitate is produced. Then warm the liquid on the water-bath, mix it with an excess of soda, wash the precipitate with water, and dry it on the water-bath.

Chinoidine thus purified appears, in thin layers, as a dark yellowish-brown, transparent mass, completely soluble in benzol, alcohol and acids. Ether should dissolve at least 70 per cent. of it. The saturated compounds with acids have an alkaline reaction, and must be soluble in water, in all proportions. Salts of impure chinoidine yield clear solutions only with a *little* water; on the addition of more water they are rendered turbid.

Borate of Chinoidine is prepared, according to the same authority, as follows: Commercial chinoidine, 2 parts; boric acid, 1 part; distilled water, 20 parts.

Dissolve the acid in the water by heat in a covered enamelled vessel; then add the chinoidine and boil until it has become liquid and is partly dissolved. Then allow the mixture to remain quiet a few minutes and pour the still warm, clear liquid through a funnel the neck of which is closed with a small pellet of cotton. Boil the clear filtrate for a few minutes in the covered vessel, and again pour through the funnel in order to remove the brownish-black, apparently resinous matter. Repeat this boiling of the filtrate, and, if anything more is separated, repeat it once more. Then evaporate the last filtrate (which may be cloudy, but will, when cold, become clear without separating anything) until its weight is equal to that of the chinoidine used, and set it aside for one night, at a temperature of not over 15° C. Separate the liquid, by pouring through a funnel stopped with cotton, from the separated boric acid,—the quantity of which is dependent on the purity of the chinoidine used—evaporate it to dryness on a water-bath, and rub the residue to powder.

A yellow powder, forming a yellow, alkaline solution with 3 parts of water. A solution of 1 part of the powder in 10 parts of water, when heated to boiling, should become quite cloudy, but recover its transparency on cooling. This solution should not be rendered cloudy by the addition of a few drops of solution of hyposulphite of sodium. The compound should contain at least 54 per cent. of chinoidine, and should have a right-handed rotation, varying, according to the chinoidine used, from $[\alpha]_D = +10°$ to $[\alpha]_D = +25°$.

Kinovate of Chinoidine.—The following formula is given: Chinovic acid (see Organic Acids) 5 parts; magnesia, 1 part; distilled water, 50 parts; purified chinoidine, q. s. Mix the chinovic acid and magnesia accurately with the distilled water, filter and add to the filtrate a solution of purified quinoidine in dilute sulphuric acid as long as a precipitate is produced. Collect this on a filter, wash it, and dry it at a gentle heat.

A grayish-white powder, insoluble in water.—New Rem., January, 1882, p. 11.

Iodosulphate of Chinoidine—De Vrij's Reagent for Quinine.—See "Quinine" above.

Chinoidini Hydrochloras (Hydrochlorate of Quinoidine.)—Formula of the Dutch Society for the Advancement of Pharmacy.—Purified quinoidine, 1 part; distilled water, 4 parts; dilute hydrochloric acid, q. s. Heat the quinoidine with the distilled water on a water-bath, and add sufficient of the dilute acid to produce a complete solution, taking care that the solution retain a slightly alkaline reaction. Filter, if necessary, evaporate on the water-bath to dryness, powder the residue while still warm, and preserve it in a well-closed vessel.

A yellow, very hygroscopic powder, yielding with water, in all proportions, a clear solution.—New Rem., March, 1882, p. 72.

Tannate of Chinoidine—Preparation, etc.—Reiber and Klamann prepare tannate of chinoidine by diluting 100 grams of tincture of chinoidine (chinoidine 2 parts, alcohol 17 parts, hydrochloric acid 1 part) with 500 grams of water, and adding a solution of 50 grams of tannin in 1000 grams water, and subsequently a solution of ammonium acetate. After 10 hours the precipitate is collected, washed and dried at a temperature not exceeding 30° C. (86° F.). It is of a yellowish-brown color, tasteless, and yields with cold water, on the addition of a little hydrochloric acid, a dark-yellow solution. The dose to small children is 0.5 to 1.0 gram (gr. viii. to xv.).—Am. Jour. Phar., September, 1881, p. 456; from Phar. Centralhalle, 1881, p. 273.

Chinoline—Commercial Quality.—In the different notices that have appeared, and in the advertisements now being distributed by English agents of certain German manufacturers, it appears to be taken for granted that leucoline from coal-tar, chinoline from cinchonine, and the chinoline as prepared by Skraup's process, are identical bodies. Mr. Charles Ekin draws attention to the fact that it was established years ago by Greville Williams, that leucoline and chinoline were by no means absolutely identical, two very marked reactions distinguishing the one from the other. Chinoline from cinchonine gives, with bichromate of potassium, a yellow crystalline precipitate, and with amyl iodide, the beautiful color known as cyanine. Leucoline from coal-tar does not give either of these reactions. To determine the behavior in these respects of the chinoline of the market, Mr. Ekin has now examined several samples of German manufacture. The one labelled pure gave only, after several days' standing, a few crystals characteristic of chinoline, and the greater part, which was insoluble in dilute hydrochloric acid, was found to consist of unconverted nitrobenzol. The portion soluble in acid was largely of aniline. Another sample of chinoline, also labelled pure, also contained aniline and nitrobenzol, but gave copious yellow crystals with bichromate of potassium. On the other hand, it failed to produce the least trace of cyanine. With samples of tartrate of chinoline similar unsatisfactory results were obtained. The author concludes that probably the German chinoline is a mixture of homologous bodies, and that a thorough investigation as to its composition seems desirable.—Pharm. Jour. Trans., February 11th, 1882, p. 661.

Quinoline (*Chinoline*)—*Physiological Effects, etc.*—Jules Donath has studied the reactions and physiological effects of quinoline, which, in view of its close relationship to quinia, is supposed to have valuable antiseptic and antimalarial power. His results are summarized as follows:

I. Quinoline is an energetic destroyer of bacteria and fungi. It can prevent lactic fermentation already in 0.2 per cent. solution.

II. It does *not* arrest alcoholic fermentation, even in 5 per cent. solution. But, contrary to Liebig's statement, quinine does not possess this power either.

III. *Reactions.*

1. An aqueous solution of a salt of quinoline yields a white precipitate with *potassa.* The precipitate is difficultly soluble in an excess of potassa, but easily in ether, benzin, strong alcohol; less easily in carbon disulphide, chloroform, and amylic alcohol. *Carbonate of sodium* likewise throws down white quinoline, while carbonic acid escapes.

2. *Ammonia* produces a white precipitate, tolerably soluble in an excess of the precipitant. *Carbonate of ammonium* behaves similarly.

3. *Iodine in iodide of potassium* (7 parts KI and 5 parts I in 100 parts water) produces a red-brown precipitate, insoluble in hydrochloric acid. Limit 1 in 25 000.

4. *Phosphomolybdic acid* (10 parts of sodium phosphomolybdate in 100 parts of water and addition of nitric acid to strongly acid reaction) yields a yellowish-white precipitate (soluble easily, and without color, in ammonia) in a solution of quinoline acidulated with hydrochloric or nitric acid. Limit 1 in 25,000.

5. *Picric acid* (1 per cent. sol.) produces a yellow, amorphous precipitate, soluble in alcohol, less so in hydrochloric acid, easily in potassa, with reddish-yellow color. Limit 1 in 17,000.

6. *Mercuric chloride* (5 per cent. sol.) produces a white, flocculent precipitate, easily soluble in hydrochloric acid, difficultly in acetic acid. Limit 1 in 5000.

7. *Potassium-mercuric iodide* (5 parts KI, 1.4 parts $HgCl_2$, in 100 parts water) produces a yellowish-white, amorphous precipitate, which, on addition of hydrochloric acid, is converted into slender, amber-colored crystalline needles (*characteristic reaction*). Limit 1 in 3500.

8. *Ferrocyanide of potassium* imparts a reddish color to solutions of salts of quinoline. On the addition of a mineral (not acetic) acid, a reddish-yellow, amorphous, afterwards crystalline, precipitate is produced. Limit about 1 in 1000.

9. *Bichromate of potassium*, carefully added, forms slender, dendritic needles, soluble in an excess.

10. *Tannic acid* or *ferric chloride* produce no precipitates. Neither *nitric* nor *sulphuric* acid, with or without oxidizing agents, produces any color-reactions.

IV. *Physiological Observations.*—Quinoline, when taken internally, is altered in some manner, as it cannot be detected in the urine.

Quinoline and its salts may be administered in doses amounting to about 2 grams (30 grains) per twenty-four hours, without injury.—New Rem., December, 1881, p. 364; from Ber. d. Deutsch. Chem. Ges., 1881, p. 1769.

Chinoline Compounds—Solubility.—Dr. Julius Donath experimented with chinoline salicylate, prepared by E. Schering, and found it to be not completely soluble in 100 parts of water, and the paroxybenzoate of chinoline even in 120 parts of water. Both salts do not even yield a 1 per cent. solution with alcohol of 10 per cent., although both are freely soluble in strong alcohol; they cannot, therefore, be easily administered in liquid form, and no observations have been made with their administration as powder, followed by strongly alcoholic or by acidulous drinks. Chinoline tartrate seems to deserve the preference of all known compounds of the alkaloid, the solubility being intermediate between the deliquescent compounds with mineral acids, and the sparingly soluble ones with the aromatic acids.—Am. Jour. Pharm., March, 1882, p. 117; from Pharm. Ztg., 1882, No. 2.

Tartrate of Quinoline—Therapeutic Value.—Dr. Loewy finds the tartrate of quinoline to be a good antipyretic, and that it deserves to be ranked alongside of quinine. It is, moreover, the only salt of quinoline which can be readily obtained in non-deliquescent crystals. He gives it to adults in the same doses as quinine, namely, 1 gram (15½ grains), to be taken three hours before the attack, in two or three portions.—New Rem., February, 1882, p. 48; from Pharm. Centralh., 1881, No. 46.

Strychnia—Isolation.—Mr. A. H. Allen recommends a mixture of equal volumes of ether and chloroform for the separation of strychnia recently precipitated from an aqueous solution. Ether alone has very little solvent power, and chloroform does not readily separate from the aqueous liquid.—Am. Jour. Pharm., February, 1882, p. 53; from Analyst, 1881, p. 141.

Neutral Sulphate of Strychnia—Preparation.—Mr. C. Rammelsberg observes that to prepare the neutral sulphate $(C_{21}H_{22}N_2O_2)_2H_2SO_4$, a solution of the acid sulphate is divided into two equal portions, one-half is precipitated by ammonia, and the precipitate is added to the other part of the solution, and the mixture boiled. On cooling the liquid deposits the neutral salt in transparent prisms, containing 5 molecules H_2O. The crystals are anhydrous at 200° C. By the spontaneous evaporation of an aqueous solution of this salt transparent pyramids belonging to the quadratic system are obtained. These crystals contain 6 molecules H_2O. Commercial strychnia sulphate, $C_{21}H_{22}N_2O_2,H_2SO_4 + 2H_2O$, crystallizes in needles. The water is expelled at 150° C.—Am. Jour. Pharm., December, 1881, p. 628; Ber. d. d. Chem. Ges., 1881, p. 1231, and Jour. Chem. Soc.

Strychnia—Compound with Iodoform.—According to Lextrait such a compound may be obtained when 5 grams of crystallized iodoform and 12 grams of strychnine are dissolved in about 500 cubic centimeters of 85 per cent. alcohol at a temperature approaching the boiling-point. After twenty-four hours crystals separate from this solution, which are washed with a little alcohol, quickly pressed between bibulous paper, and dried with exclusion of the air and light. The compound has the composition $(C_{21}H_{22}N_2O_2)_3CHI_3$. It is decomposed by light with the separation of iodoform. It is insoluble in both hot and cold water; alcohol of 98 per cent. dissolves 3.40 grams in a liter at 15° C.; in ether and chloroform it is likewise soluble. On being heated to 90° C., it begins to decompose, and chars at 130° C. With boiling water it is decomposed with the volatilization of iodoform, while strychnine remains; the alcoholic solution suffers a partial dissociation, so that it is easy to purify the compound by repeated crystallization from alcohol without a large portion becoming decomposed. With quinine iodoform appears to form a similar compound.—Am. Jour. Pharm., March, 1882, p. 119; from Pharm. Zeitung, No. 94; from Jour. Pharm. Chem.

Aspidospermine—Pharmacological Properties.—Dr. G. Gutmann has conducted several experiments to ascertain the pharmacological properties of several aspidospermine preparations, and gives the following results of his researches:

I. Aspidospermine has a poisonous effect on the organs of respiration and circulation of both warm- and cold-blooded animals.

II. In the case of cold-blooded animals paralysis of the respiratory organs, accompanied by a weakening of the heart's action, first takes place, death ensuing by the action of the poison on the nœud vital.

III. In the case of warm-blooded animals the heart is first affected, followed by a considerable weakening of the pulse, a reduction of the temperature of the body, sometimes very considerable, in most cases accompanied by a gradual dyspnœa. Death ensues from paralysis of the heart.—Chem. and Drug., December 15th, 1881, p. 529; from Arch. f. Exp. Pathol. und Pharmakol., November 8th, 1881.

Mydriatic Alkaloids—Origin and Relations.—In a paper communicated to the British Pharmaceutical Conference ("Yearbook of Pharm.," 1881, pp. 415–416), Mr. E. Merck gives the following synoptical account of the three mydriatic alkaloids, and of their origin, which may properly find place in this report:

1. *Atropine* occurs:

(*a.*) In *Atropa Belladonna, L.* Is the "atropinum verum." Is also known as "heavy atropine."

(*b.*) In *Datura Stramonium, L.* Is "daturinum verum" or "heavy daturine."

2. *Hyoscyamine* is found:

(*a.*) In *Hyoscyamus niger, L.* It is from this source that the hyoscyamine of Merck is prepared.

(*b.*) In *Atropa Belladonna, L.* So-called "light atropine." It is sometimes met with in commerce as atropine.

(*c.*) In *Datura Stramonium, L.* Commonly known as "light daturine."

(*d.*) In *Duboisia myoporoides, R. Brown.* So-called "duboisine."

3. *Hyoscine.*—As yet only found in *Hyoscyamus niger.* Hyoscine dilates the pupil like atropine, to which alkaloid indeed it bears considerable resemblance in physiological action.

Clinical trials. made by Professor Edlefsen, of Kiel, have shown hyoscine in certain cases to exercise a more constant and surer action than atropine, and that it possesses a soothing and soporific influence. Beneficial results were obtained in the treatment of whooping-cough, asthma, and epilepsy. The hydriodate is the salt which has been most commonly employed, but the hydrobromate is also prepared.

Atropine—Components of the Medicinal Alkaloid.—J. Regnault and F. Valmont find the atropine of medicine to be a variable mixture of two isomeric crystalline alkaloids, possessing the same therapeutic properties. One of these is

Atropine.—a (Atropine of Ladenburg); the other is

Atropine.—β (Hyoscyamine of Ladenburg), which the author preferably calls

Atropidine.—This exists in such abundance in belladonna that it forms about two-thirds of the crystalline atropine of the Codex. It is the crystalline alkaloid of all the mydriatic *Solanaceæ* and of *Duboisia*, and has been improperly called daturine and duboisine.—Chem. News, October 28th, 1881, p. 215; from Jour. de Phar. et de Chim., July, 1881.

Atropine—Improved Process of Extraction.—Having tested the various methods recommended for the extraction of atropine with indifferent success, Mr. A. W. Gerrard has devised the following satisfactory process: Pack 1000 grams of well-powdered belladonna leaf or root in a percolator, and allow it to macerate twenty-four hours with 1000 c.c. of 84 per cent. alcohol; now add in parts of 250 c.c. at intervals of about four hours another 1000 c.c. of alcohol; when percolation ceases displace with water, recover the alcohol by distillation, and treat the extract with five times its volume of water; carefully separate the resin and fatty matter and wash it twice, mixing all the washings; evaporate them to 300 c.c., and add a good excess of ammonia;* expose in a shallow dish for some hours that excess of ammonia may volatilize; now shake well with an equal volume of ether, separate the ether and withdraw the atropine from it by shaking with a small volume of water and repeated additions of acetic acid. Working in this way the ether may be used continuously to extract the mother-liquor until it is exhausted. The acetic solution of atropine is now shaken with and filtered through a little animal charcoal, concentrated to a small volume, treated again with ammonia and dissolved out a second time with ether. Allowing the ether to spontaneously evaporate, the atropine will separate in exceedingly fine filamentous crystals of a satiny lustre and almost white. Two more crystallizations will render them quite white. In conducting this process it is important to remove the whole of the alcohol from the tincture, also to employ ether free from alcohol.—Yearbook of Pharm., 1881, pp. 480–482.

Atropine—Pilocarpine as Antidote.—Dr. Joseph Kouders recommends pilocarpine as an antidote to atropine. It is employed by injecting 1 to 3 centigrams hypodermically at intervals of from 30 to 50 minutes until the action of the pilocarpine is produced. He also calls attention to the probability of the successful application of atropine as an antidote for pilocarpine.—Am. Jour. Phar., March, 1882, p. 120, through Phar. Ztg.; from W. Med. Wochenschr., No. 45.

Atropine and Daturine—New Color Reaction.—D. Vitali has observed that if a specimen of either of these alkaloids or of their salts is covered with a little fuming nitric acid, allowed to dry on a water-bath, and when cold moistened with a drop of potassa dissolved in alcohol, a violet color is instantly produced, and soon passes to a fine red. Strychnia also gives a beautiful red, but not the violet color when similarly treated. None of the other important alkaloids give a similar reaction. 0.000001 gram of atropine can thus be detected.—Chem. News, June 30th, 1882, p. 288; from Zeitschr. f. Anal. Chem., xx., No. 4.

Homatropine—Preparation, Characters, and Physiological Action.—Prof. F. B. Power gives an extensive review of the present knowledge of homatropine, both as to its formation and preparation, and its physiological action. Much of this has already been noticed in the "Report" for 1881 (see Proceedings, 1881, p. 337–338). The following may, however, find place here.

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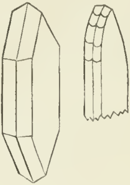
* This, for several important reasons, is regarded far preferable to the potassic hydrate or carbonate usually directed.

The decomposition of atropine, with the assimilation of 1 mol. of H_2O, into tropine and tropic acid having been accomplished by Kraut and Lossen, Professor Ladenburg, in 1879, succeeded in reuniting these, so as to form, with the elimination of 1 mol. of H_2O, the original atropine. The success of this reaction led the same chemist to the expectation that other bases might be obtained in the same way, by the treatment of various tropine salts with dilute hydrochloric acid. This hope was fully realized, and in this manner an entire group of alkaloids may be formed, which, like atropine itself, are deducted from tropine, and to which the generic name of

FIG. 64.



Homatropine Hydrobromate Crystal.

Tropeines has been applied. Of these new bases or tropeines, Ladenburg (1880) has prepared and more particularly described the following:

Oxybenzoyltropeine, $C_{15}H_{19}NO_3$.
Paraoxybenzoyltropeine, $C_{15}H_{19}NO_3$.
Orthoxybenzoyltropeine (Salicyl tropeine), $C_{15}H_{19}NO_3$.
Benzoyltropeine, $C_{15}H_{19}NO_2$.
Atropyltropeine (Anhydro-atropine), $C_{17}H_2NO_2$.
Phtalyltropeine, $C_{24}H_{32}N_2O_4$.
Cinnamyltropeine, $C_{17}H_{21}NO_2$.
Oxytoluyltropeine (Homatropeine), $C_{16}H_{21}NO_3$.

This latter compound, or rather its hydrobromate, has alone found as yet practical application, and is readily obtained by the treatment of amygdalate of tropine with hydrochloric acid, whereby the elements of water are eliminated and homatropine is produced according to the following equation:

$$\underbrace{C_8H_{15}NO.\ C_8H_8O_3}_{\text{Tropine Amygdalate.}} - H_2O = \underbrace{C_{16}H_{21}NO_3}_{\text{Homatropine.}}$$

Homatropine was obtained by Ladenburg only in the form of an oil, but more recently Merck, of Darmstadt, has succeeded in obtaining it in transparent, colorless prismatic crystals from its solution in absolute ether. The crystals, though not readily soluble in water. are, nevertheless, hygroscopic and very deliquescent; their melting-point is between 95.5° and 98.5° C.

Homatropine-gold Chloride, $C_{16}H_{21}NO_3.HCl.AuCl$, is usually precipitated as an oil, but soon crystallizes, and may be recrystallized from hot water. It is thus obtained in handsome, sparingly soluble prisms.

Homatropine picrate. $C_{16}H_{21}NO_3.C_6H_2(NO_2)_3OH$, is precipitated in an oily or resinous form, but soon becomes crystalline. It dissolves readily in hot water, and crystallizes therefrom in yellow, shining laminæ.

Homatropine sulphate and *hydrochlorate* are also crystallizable salts, and the acid solution of the latter shows the following behavior toward reagents: tannic acid gives no turbidity; potassio-mercuric iodide a white curdy precipitate; mercuric chloride a white oil; iodine in iodide of potassium, yellow crystals together with a black oil; platinic chloride an amorphous precipitate in concentrated solution, and from the filtrate handsome needles on evaporation.

Homatropine hydrobromate, $C_{16}H_{21}NO_3.HBr$, may be readily obtained in the crystalline form, and may therefore be directly prepared from the unpurified base. The crystalline mass thus obtained may be recrystallized from water, when the pure salt is obtained in large, wart-like aggregations of crystals. These crystals have the form of rhombic prisms, with irregularly developed pyramidal surfaces (as shown by Fig. 64). The salt is not hygroscopic, dissolves in ten parts of water, and the solutions do not readily undergo change.—Am. Jour. Phar., April, 1882, p. 145–146.

Crystallized Hyoscyamia—Preparation.—H. Duquesnel observes that if finely and freshly ground hyoscyamus seeds are exhausted by boiling alcohol, slightly acidulated with tartaric acid, a tincture is obtained which, when deprived of alcohol by distillation, leaves behind an extract composed of two distinct portions. The lower, denser and syrupy portion is employed in the preparation of the alkaloid, while the other, lighter portion, composed of a very abundant green oil, is carefully rejected. He finds, however, that it is this portion that is alone suitable for the preparation of colorless, crystalline hyoscyamia, since it contains 0.5 per 1000 of the seeds, while the syrupy portion usually employed can be made to yield very small quantities of the crystallized alkaloid only with great difficulty. The greater part obtained from the latter is amorphous, though it was obtained by the author odorless and not much colored, differing in this respect from the commercial product. The following is his mode of preparing the colorless crystalline alkaloid:

The green oil, well separated by decantation from the syrupy layer, is agitated several times with dilute sulphuric acid, which extracts the alkaloid, the latter being probably combined with a fatty acid.

If the agitation has been performed carefully, the acid liquid separates well and may readily be removed, after which the substance is treated twice more with dilute sulphuric acid. The united acid liquids are nearly completely saturated with bicarbonate of potassium, then filtered, and evaporated on the water-bath. When the residue is in a syrupy condition, it is treated in the cold with strong alcohol, which leaves behind the sulphate of potassium. The alcohol is distilled off and the last portions volatilized on the water-bath. The residue is diluted with water until it has the consistence of a very light-colored syrup, then treated with bicarbonate of potassium in slight excess and several times agitated with chloroform, which extracts the alcohol. The decanted and filtered chloroform is treated with dilute sulphuric acid in slight excess; the sulphate of hyoscyamine thus formed is decolored by washed animal charcoal, and afterwards evaporated to a syrupy consistence at a very gentle heat.

In order to extract the alkaloid, the use of alkalies must be avoided, as they easily alter hyoscyamine as long as it has not been freed from the accompanying impurities.

For this purpose the sulphate of hyoscyamine is mixed with an excess of precipitated carbonate of calcium, which, by prolonged contact, has the property of setting free an unstable carbonate of the alkaloid, and thereby the alkaloid itself.

The mixture is mixed with fine sand in order to better subdivide it, and dried at a very gentle heat, or better still, under a bell glass over sulphuric acid or caustic lime. When it is dry and finely powdered, it is treated with pure chloroform until the latter ceases to acquire an alkaline reaction. The chloroform is then distilled off, partly at a very gentle heat, the rest evaporated spontaneously, after some rectified toluol has been added, to retard evaporation. In this manner crystals are obtained, which we have the honor to present to the Academy.

Hyoscyamine thus obtained crystallizes in long, colorless, prismatic needles, grouped around a point in form of a star.

It is tolerably soluble in water, to which it communicates a strong alkaline reaction, combines with acids, and yields, particularly with sulphuric acid, a neutral, crystalline, and but little deliquescent salt.

It is a powerful mydriatic, acting, under like circumstances, exactly like atropine. Its chemical reactions also seem to have a great resemblance to those of atropine.—New Rem., January, 1882, p. 3; from Rép. de Pharm., 1881, p. 510.

Aconitine—Yield from Aconite Root according to Different Processes.—Mr. Schneider ("Archiv d. Pharm.," vol. 219, No. 5), tried different processes to ascertain the comparative yield of alkaloid. The process of the British Pharmacopœia yielded only 0.002 per cent., or 1 part of alkaloid from 50 000 parts of aconite. Morton's process ("Buchner's Commentar z. Ph. Germ.," 1874) gave 0.127 per cent., of a light-yellow electric powder. Hirzel's process yielded 0.0046 per cent. ("Vorträge über Pharmacie," Leipzig). Wittstein's process ("Anleitung zur Darst.," etc.) gave 0.14 per cent. in well-formed, isolated, six-sided tablets. Hottot and Liégois's process ("Dorvault's Officine;" approaching in its main features that of the United States Pharmacopœia), yielded 0.296 per cent. of crystals. Duquesnel's process ("Jahresbericht d. Pharm.," 1872) gave 0.339 per cent. of well-developed crystals.

The good results of the last named process are ascribed by the author to the fact that Duquesnel extracts with 90 per cent. alcohol, containing 1 per cent. of tartaric acid, by cold percolation, while all the others use more or less heat, some with and others without sulphuric acid.—New Rem., May, 1882, p. 145.

Aconitine—Relative Toxic Effect as obtained from Different Manufacturers.—In April, 1880, a case of death by poisoning occurred at Winschoten, in Holland, which was supposed to have been due to an error in dispensing a mixture containing nitrate of aconitine. It subsequently developed that the pharmacist had dispensed the prescription correctly: that is to say, he had dispensed the prescribed quantity of nitrate of aconitine (a 0.2 per cent. solution in tinctura chenopodii ambrosioid.), but that he had used a nitrate of aconitine which had been obtained originally from Petit, of Paris, whilst the physician had expected one sold by Friedländer, of Berlin, which appears to be manufactured by Trommsdorf, of Erfurt. Professor P. C. Plugge, to whom, together with Professor Huisinga, the subject was referred at the time, now communicates the results of a series of elaborate experiments made with 1. The nitrate of aconitine dispensed with fatal result (Petit's); 2. Nitrate of aconitine, prepared by E. Merck, of Darmstadt; and 3. Nitrate of aconitine from Friedländer, of Berlin. The results of these investigations show:

(1.) That Petit's nitrate of aconitine has a poisonous action at least 8 times stronger than that of Merck's, and 170 stronger than that of Friedländer's.

(2.) That Merck's nitrate of aconitine has a poisonous action at least 20 to 30 times stronger than that of Friedländer's.

It also appears from the foregoing that the preparations known as "German aconitine" are not always of the same strength, there being a much greater difference between the two German preparations examined than between the more powerful of the two and the French preparation. Seeing the great possibility of variation in the preparations sent into the market, the author emphasizes the necessity that physicians should exercise the greatest care in prescribing aconitine and its salts. Furthermore, that the official maximum dose in the Dutch Pharmacopœia, of 4 milligrams, or 32 milligrams daily, should be struck out, as in this case it proved fatal.—Amer. Jour. Pharm., April, 1882, pp. 171–174; from Archiv d. Pharm., January, 1882; through Pharm. Jour. Trans., February 18, 1882.

Aconitine—Preparation and Characters of Different Preparations.—Mr. A. Schneider reviews the characters and the compositions of the aconitines obtained by different methods, and as found in the market. He has also prepared the alkaloid by the different methods recommended (Brit. Pharm., Morson's, Hager, Hirzel, Wittstein, Hottot, and Liegeous, Codex Français, Frisch, Duquesnel, and Loesch), and has found the method of Duquesnel* to yield the best results, both qualitatively and quantitatively. Next to this, he recommends that of Hottot. He regards it of primary importance that the alkaloid be prepared without the use of mineral acids, and with the application of the lowest possible temperature only, because of its ready conversion into apoaconitine by the action of the acids and its splitting into benzoic acid and aconine by the action of heat. He has, therefore, conducted all his distillation *in vacuo*, and has worked as much as possible with the exclusion of air. Furthermore, it is necessary to avoid the use of ammonia when precipitating aconitine, because of its solubility in that alkali. A loss is also occasioned by the use of animal charcoal, which must be likewise avoided. This is compensated by repeated combination of the alkaloid with acid, treatment with alkali, and shaking with ether. The following table gives the characters of different aconitines examined by the author:

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* The formulas of Duquesnel and of Hottot and Liégeous may be briefly given as follows:

Duquesnel's Formula.—The tubers are extracted, by percolation, with alcohol containing 1 per cent. tartaric acid, followed by pure alcohol; the alcohol is distilled off (but *in vacuo*); this extract is shaken with ether, to remove fat, resin, extractive, etc., thrice, successively; an excess of carbonate of potassium is added, and it is then shaken four times with fresh portions of ether. The ethereal solution is shaken thrice with water containing tartaric acid, this solution supersaturated with carbonate of potassium, and again shaken with ether as before. The now colorless ethereal solution leaves the aconitine in crystalline crusts. It may be obtained in isolated crystals by resolution in ether and spontaneous evaporation.

Hottot's Formula.—This differs from the above in that sulphuric acid is used instead of tartaric acid; in the substitution of calcined magnesia for carbonate of potassium in the first precipitation, and of ammonia in the second; also, in that the sulphate solution of aconitine is towards the last decolorized by treatment with animal charcoal.—REP.

1. Cryst. aconitine. Duquesnel. Genuine.	2. Pure aconitine. Morson. Genuine.	3. German aconitine. Merck.	4. Pseudaconitine. Amorphous.	5. Japaconitine.	6. Aconitine made by Duquesnel's method
White crystalline crusts, showing only crystalline splinters under the microscope; odorless when powdered; not adherent to paper, tastes bitter and acrid.	Light yellow, homogeneous, amorphous, very electric powder; adherent on paper; narcotic odor; bitter and acrid taste.	Dirty yellow powder; not adherent to paper; odorless; mixed with fused brown globules.	Light-yellow powder; odorless; very electric; acrid and bitter taste.	White crystalline crusts, not electric, when powdered; bitter and acrid taste.	White, well-defined crystals, forming a white, non-electric powder; acrid and bitter taste.
Difficultly soluble in ether; easier in alcohol and acidulated water.	Readily soluble in ether, chloroform, alcohol, and dilute acids, leaving in the latter case an insignificant brown, flocculent substance.	Readily soluble in ether, alcohol, chloroform, and acidulated water.	Same as 3.	Same as 3.	Same as 3.
Dried at 80°-90°, unchanged, white, giving off 8.9 per cent. water; at 100°, lemon-yellow; at 170°, deeper colored, melts at 180° C. Further heat develops acid vapor, and final combustion without residue.	Dried at 80°-90°, becomes yellowish, loses 3.92 per cent.; melts at 97° C., forming on cooling a light-yellow, vitreous, fissured mass. Over 97°, gives off acid vapors, and finally is burnt, leaving 0.86 per cent. of residue, which is alkaline, and contains Na and Ca.	Dried at 80°-90°, becomes yellow, and loses 3.2 per cent.; melts at 89° C.; on cooling forms a reddish-yellow, vitreous, fissured mass; melts completely at 100° C.; becomes darker at 120°, begins to decompose with acid vapor; no residue of combustion.	Melts at 88° C.; no residue of combustion.	Melts at 135° C.; does not melt completely until 150° C.; no residue of combustion.	Melts at 180° C.; no residue of combustion.
Sinks in water; does not melt by boiling; is not colored, and solution does not react alkaline.	Swims on water; melts by boiling to a yellow resinous mass, adhering tightly to the glass; solution has a fungous odor and alkaline reaction.	Reacts like 2.	Reacts like 2, except that solution is odorless.	Swims on water; not resinous by boiling; solution alkaline.	Sinks in water; does not melt by boiling; solution reacts alkaline.
Phosphoric acid colors in steam bath, dirty violet.	do. Gray.	do. Dirty violet.	do. Greenish-brown.	do. Dirty violet.	do. Dirty violet.
Concentrated sulphuric acid colors it lemon-yellow; acid remains colorless. Aconitine becomes sticky.	Concentrated sulphuric acid forms a yellow-brown solution and resinous agglutinating mass, reddish on the edges, then becoming brown.	Reacts like 2.	Dissolves yellow, changing to brown.	Dissolves brown-yellow, changing to brown.	Reacts like 4.
Concentrated nitric acid dissolves rapidly; solution colorless.	Yellow.	Yellow.	Yellow.	Colorless.	Yellowish.
The platinum double salt contains 9.8 per cent. Pt.	13.69 per cent. Pt.	13.04 per cent. Pt.	14.29 per cent. Pt.	11.58 per cent. Pt.	16.6 per cent. Pt.

The different aconitines possessed the following properties in common: They are all precipitated white by caustic potassa, soda, and ammonia; by the carbonates of potassium and sodium; by mercuric chloride, sulphocyanide of potassium, and iodide of potassium and mercury, the precipitates by the last-named reagent becoming yellowish to yellow on standing. They are all precipitated by tannin, iodide of potassium, chloride of platinum, and chloride of gold, the last two, however, only in concentrated solution, the double salts being soluble in water, dilute hydrochloric acid and alcohol. . They are all left-rotatory.—Archiv d. Pharm., November, 1881, pp. 321–347.

Picraconitine.—A probable constituent of *Aconitum paniculatum*, which see, under "Materia Medica."

Veratrine—Preparation by Means of Oxalic Acid.—Dr. P. E. Alessandri recommends the following simple process for the preparation of veratrine from the seeds of *Veratrum Sabadilla:* The crushed seeds are exhausted by maceration with a 2 to 3 per cent. solution of oxalic acid for 24 hours. The clear liquid obtained is neutralized by ammonia, and the precipitate, which forms in about half an hour or so, is separated by filtration, and dissolved in pure *cold* alcohol. The alcoholic solution on evaporation yields sufficiently white and crystalline veratrine. It is obtained perfectly pure by dissolving it in ether. If *hot* alcohol were used, a reddish-yellow resin would contaminate the product.—Pharm. Jour. Trans., June 3, 1882, p. 993; from L'Orosi, v., p. 1.

Theobromine—Preparation, Character of Salts (?), etc.—H. Pressler has subjected theobromine and its salts to study. The methods of Dragendorff and of Wolfram for its preparation were not quite satisfactory. The following is recommended: Powdered cacao, deprived of oil, is mixed with one-half its weight of caustic lime, made into a paste with water, and digested with alcohol of 50 per cent. in a retort provided with a reversed condenser. After cooling, the nearly colorless filtrate separates some pure theobromine, the remainder being obtained after distilling off the alcohol. By recrystallization, theobromine is obtained perfectly pure. Its composition is $C_7H_8N_4O_2$. The author endeavored to prepare some of the salts of theobromine—the chlorohydrate, chloroplatinate, sulphate, nitrate, and acetate. Like caffeine, all of its salts are characterized by instability, being resolved into their components by washing or by heat. Even the sulphate, which, in the case of caffeine, has been found by Biederman to possess the greatest stability, is, in the case of theobromine, very easily decomposed. Real compounds of theobromine with organic acids, also, do not appear to exist. The author, furthermore, studied some of the decomposition products of theobromine—the action of iodide of methyl, of concentrated hydrochloric acid, of nitric acid, and of hydrate of barium.—Arch. d. Pharm., January, 1882, pp. 53, 54; from the author's Inaugural Thesis.

Theobromine and Caffeine—Formation from Xanthine.—Xanthine has the composition $C_5H_4N_4O_2$, and differs from theobromine, $C_7H_8N_4O_2$, by having 2 carbon and 4 hydrogen atoms less. Strecker already suggested that the second base might be a dimethyl derivative of the first. This view had not, however, been hitherto substantiated by experiment. Emil Fischer has now established this fact by converting xanthine into theobromine, and this then into caffeine. He accomplished this by dissolving xanthine in caustic soda solution. and then precipitating by acetate of lead, whereby he got a white crystalline xanthine lead. This salt, dried at 130° C., was heated with 1¼ times its weight of methyl iodide in closed tubes, for 12 hours. to 100° C. The contents of the tube, which are nearly dry, are boiled with water, freed from remaining lead by hydrogen sulphide, and, after saturation with ammonia, evaporated to crystallization. There is obtained in this way a slight yellowish. crystalline powder. which, on analysis, proved to be theobromine. To settle all doubts, it was then converted, after the method of Strecker, into caffeine. So that theobromine and caffeine are to be considered as respectively dimethyl- and trimethyl-xanthine. The above-described change of xanthine into theobromine and caffeine also points to the possibility of obtaining this base, shown to be the fundamental part of two most important articles of diet, from quite a different crude material, viz., guano.—Am. Jour. Phar., May, 1882, p. 218; from Ber. Chem. Ges., xv., p. 453.

Colchicin—Preparation, Composition, and Relation.—Mr. J. Hertel has comprehensively investigated this principle, and particularly in its relation to colchicein and other products of its decomposition. He finds that commercial colchicin is not a pure product, being usually a mixture of colchicin with fruit-sugar and other impurities, and even the article designated as "colchicinum purum" contains, as a rule, but from 10 to 20 per cent. of pure colchicin. He obtains pure colchicin by extracting the *whole* colchicum seed in a displacement apparatus with 85 per cent. alcohol, using the latter finally at a boiling temperature. The united liquids, which possess a slight acid reaction, are treated with calcined magnesia, filtered after standing some hours, and distilled on a steam-bath, *in vacuo*, to the consistence of a liquid extract; this is mixed with about ten times its amount of water, the oily matter is removed, the watery liquid filtered and repeatedly shaken with chloroform, which, on distillation, leaves a syrupy liquid. By spreading this upon glass plates and warming for an hour at 80° to 100° C., the colchicin is obtained as an amorphous, brown, brittle mass, which may be purified by again dissolving it in about 20 times its weight of water, whereby the coloring-matter, which is insoluble in water, remains behind. The filtrate is evaporated in a shallow capsule, and yields from 0.38 to 0.41 per cent. of pure colchicin, the yield being larger when the entire seeds are treated as above than when the previously-ground seeds are employed.

Colchicin, when pure, is amorphous; from dried seed, sulphur-yellow; and from fresh tubers, colorless. It is only very slightly alkaline, if at all, the reaction appearing in litmus only, when it has become nearly dry, and may, therefore, be due to the formation of ammonia. By prolonged exposure to the air, or when exposed to a high temperature with water, it is converted into a substance of a coffee-brown color, *colchico-resin*, to which the color of colchicin is due, and which, being almost insoluble in water, is removed by the above process of purification. By the action of dilute acid, colchico-resin is converted into *beta-colchico-resin*, which is completely insoluble in water, and a soluble substance, the nature of which has not yet been determined. By heating colchicin with dilute hydrochloric acid, it is converted into *colchicein*, which, when pure, is perfectly white and odorless, crystalline (in two forms of the rhombic system), soluble in alcohol, chloroform, solution of potassa, and ammonia-water. Subjected to analysis, *colchicin* gave figures corresponding to the empirical formula, $C_{17}H_{23}NO_6$; *colchicein*, $C_{17}H_{21}NO_5 + 2H_2O$; *colchico-resin*, $C_{51}H_{60}N_2O_{15}$; and *beta-colchico resin*, $C_{34}H_{39}NO_{10}$. The author believes that colchicin should be dismissed from the group of organic bases, since it possesses little in common with that group, as has already been pointed out by Huebler. The slight alkalinity of colchicin to litmus is probably due to ammonia, as already observed, for the latter is formed during its conversion into colchico-resin and beta-colchico-resin. An interesting result, also, is the reconversion of colchicein into colchicin by heating the former with water.

As regards the pharmaceutical preparations of colchicum, the author advises their preparation with alcohol of at least 90 per cent., and that the acetum, vinum, and oxymel should be discarded. He bases his advice upon the fact that colchicin has a great tendency to become converted into colchico-resin and beta-colchico-resin, both of which are insoluble, or but very sparingly soluble, in water and cold dilute alcoholic menstrua. A solution of pure colchicin in alcohol is preferable to all other preparations of colchicum.—Am. Jour. Phar., September, 1881, pp. 443–450; from Phar. Zeitschr. f. Russ., 1881, pp. 245–320.

Pilocarpine and Salts—Examination.—The amount of water of crystallization in three commercial samples of pilocarpine hydrochlorate was found by A. Christensen to vary between 2.97 and 3.78 per cent., and in two samples of nitrate was 1.01 and 1.29 per cent. The former contained 14.5 and 15.0 per cent. of hydrochloric acid and 84.6, 85.5 and 86.9 per cent. of alkaloid; the nitrate yielded 21.1 and 23.7 per cent. of acid, and 76.2 and 78.8 per cent. of alkaloid. For the determination of the latter Poehl's method with phosphomolybdic acid yielded by far too large results; with Mayer's solution volumetric and gravimetric determinations gave incorrect results, and the experiments, consisting in decomposing the salts with NaOH, dissolving in chloroform and titrating with $\frac{1}{10}$ normal acid, indicated that the alkaloid had been decomposed with the formation of an acid body. The above-mentioned results were obtained by the gravimetric method with chloride of gold.

The qualitative reactions of the five samples of salts and two samples of hydrate showed no difference in their behavior; but the physiological experiments made by Dr. Podwissotzki showed that four samples (marked *T*) acted similar to jaborine and atropine, while three samples (marked *M* and *N*) acted more feebly, like pilocarpine and nicotine. In the former the presence of the alkaloid jaborine could not be proven, and the author is inclined to assume jaborandi leaves to contain, besides pilocarpine, a second similar alkaloid, and that the different methods employed by manufacturers may yield either one or a mixture of both alkaloids.—Am. Jour. Phar., January, 1882, p. 17; from Phar. Zeitschr. f. Russl., 1881.

Pilocarpine—Decomposition.—According to Chastaing, this alkaloid is decomposed by heating with caustic potassa into carbonic acid, butyric acid, methylamine, and traces of acetic acid, according to the equation:

$$C_{11}H_{16}N_2O_2 + 5H_2O = CO_2 + 2C_4H_8O_2 + 2CH_5N + O.$$

Occasionally, and especially when the pilocarpine has been previously treated with fuming nitric acid, bases of the pyridine series are also formed.—Am. Jour. Phar., May, 1882. p. 226; through Chem. Ztg., No. 10, 1882, p. 184; from Compt. Rend., 94, p. 223.

Alkaloids of Hydrastis and of Berberis—Distinction.—Mr. Henry B. Parsons, in connection with his paper, detailing the results of a proximate analysis of the root of *Berberis aquifolium*, var. *repens*, communicates the following table, showing the characters of distinction between berberina, hydrastina, and oxyacanthina. Of these, berberina is present in the roots of *Hydrastis canadensis*, of *Berberis aquifolium*, and of *B. vulgaris;* while hydrastina is a characteristic equivalent of the first-named plant, and oxyacanthine of the two last named. He considers it probable that the presence of berberina, together with certain other alkaloids, may be of service in the identification and classification of doubtful botanical specimens belonging to the closely related natural orders, *Ranunculaceæ*, *Anonaceæ*. *Menispermaceæ*, *Berberidaceæ*, and *Rutaceæ*.

	Properties and Reactions.	Berberina.	Hydrastina.	Oxyacantina.
		$C_{20}H_{17}O_4$	$C_{22}H_{23}NO_6$ (?)	$C_{16}H_{23}NO_6$ (?). $C_{32}H_{46}N_2O_{11}$ (?).
1	Color	Lemon or orange	Pure white.	White; yellowish, on exposure.
2	Taste	Bitter	Nearly tasteless.	Bitter.
3	Water.	Moderately soluble	Insoluble	Nearly insoluble.
4	Absolute alcohol	" "	Soluble	Soluble.
5	Commercial 90 per cent. alcohol	Soluble	"	30 cold; 1 boiling.
6	Ether	Nearly insoluble	"	125 cold; 4 boiling.
7	Chloroform.	Moderately soluble	"	Freely soluble.
8	Benzol.	Nearly insoluble	"	Soluble.
9	Ammonia.	Soluble	Insoluble	Sparingly soluble.
10	Soda.	"	"	Moderately soluble.
11	Sodium carbonate	"	"	Nearly insoluble.
12	Tinct. iodine.	Dark-red precipitate.	Dark-red precipitate.	Dark brown-red precipitate.
13	Iodine in iodide	Nearly black precipitate	Nearly black precipitate	" " "
14	Potas. merc. iodide	Yellow precipitate.	Yellow precipitate.	Yellowish precipitate.
15	Phosphomolybdic acid	Yellow precipitate; soluble in ammonia	Brownish precipitate; not soluble in ammonia	Brownish precipitate; insoluble in, but turned dark-blue by NH_4OH.
16	Potas. cadmium iodide	Yellow precipitate	White precipitate	White precipitate.
17	Picric acid	Yellow precipitate; insoluble in dil. HCl.	Yellow precipitate; insoluble in acetic acid	Yellow precipitate; insoluble in acetic acid.
18	Platinum chloride	Yellow precipitate; soluble in HCl	Yellowish precipitate; soluble in HCl	Yellowish precipitate; insoluble in HCl.
19	Gold chloride	Yellow precip.; insol. in HCl	Yellow precip.; insoluble in HCl.	Orange precipitate; insoluble in HCl.
20	Tannic acid	Yellow precipitate; insoluble in HCl or $HC_2H_3O_2$	Brownish precipitate; soluble in $HC_2H_3O_2$, but insol. in HCl	Brownish precipitate; insoluble in $HC_2H_3O_2$ and dil. HCl.
21	Conc. sulphuric acid	Yellowish-red, olive-green, brown, olive-brown	Yellow, purple-brown, green	Brownish-purple, browner, more purple on standing.
22	Sulphuric and molybdic acids	Yellow-brown, olive-green; same warmed	Deep-green, brick-red, red-brown, dark-chocolate brown	Purple; fades slowly; becomes yellow, then green.
23	Conc. nitric acid	Orange-red; no effervescence	Orange-red; effervesces; brown and darker	Orange-red; effervesces; color permanent.
24	Fused zinc chloride	Yellow; light-brown	Light yellowish-brown	Chocolate-brown.
25	Specific rotatory power		+ 153.5 (in excess dilut. HCl)	

—New Rem., March, 1882, p. 84; from Report of the U. S. Com. of Agricult. for 1880.

Berberine—Behavior towards Thymol.—Professor J. U. Lloyd has observed that a liquid mixture results when berberine (prepared according to his process given in Proceedings, 1878, p. 800) and thymol are triturated together. The compound produced readily dissolves in alcohol with a deep orange-red color, while berberine alone dissolves very sparingly in that liquid, forming a lemon-yellow solution; and while berberine is very soluble in water, the new compound is insoluble. It may apparently be obtained in the form of crystals. It should be remarked that the author's berberine is obtained from *Hydrastis canadensis*, and that he has reasons to doubt its identity with that obtained from *Berberis vulgaris*.—New Rem., July, 1881, p. 195.

Sulphate of Beberia—Composition.—Mr. D. B. Dott has been engaged in experiments made for the purpose of determining the composition of the so-called sulphate of beberia, but has not yet finished them. He finds that (as has already been pointed out by others) the commercial (B. P.) sulphate of beberia is not a definite salt, but a purified extract of the greenheart bark. It contains 15 per cent. of water, and 7.80 per cent. of SO_3, which is equivalent to 63.8 per cent. of hydrate of beberia. The percentage is not, however, nearly so great as that, a large proportion of the SO_3 being combined with other alkaloids capable of neutralizing acids. On the whole, the author considers it doubtful whether a much better preparation of the bark could be obtained than the Pharmacopœia "sulphate," since it is more than probable that all the alkaloids (present to the amount of about 60 per cent.) contribute to its value as a tonic. At the same time it would be advisable to alter the name, which does not indicate the real nature of the substance.—Yearbook of Phar., 1881, p. 442.

Calumbine—Preparation and Separation from Berberine and Calumbic Acid.—The root of *Menispermum palmatum* has long been known to contain two bitter principles and an acid principle, which have been named by Wittstock and Boedecker, calumbine, berberine, and calumbic acid respectively. Dr. P. E. Alessandri, who considers calumbine an alkaloid, has isolated it conveniently by the following process, and found its characters to agree in every respect with those previously observed. An infusion of the powdered root is made with a 2 to 3 per cent. aqueous solution of oxalic acid. The perfectly limpid, light orange-yellow, insupportably bitter liquid is neutralized with ammonia and evaporated to one-third its bulk. When cool it is treated with ether, which is readily separated (forming no emulsion), and yields pure white calumbine on evaporation. To obtain the

Berberine the author proceeds differently. The cold oxalic infusion is neutralized with baryta, whereby a copious precipitate is formed, which is separated. It is heated, allowed to stand for 24 hours to allow crystals of oxalate of barium to deposit, and a current of carbonic acid is then passed through the clear decantate to remove baryta. It is next treated as above for calumbine, by shaking the ammoniacal liquid with ether, etc., and, after separation of the ethereal layer, the aqueous portion is evaporated to dryness. The dry residue yields the berberine to alcohol, which requires to be washed with ether. They are always straw-colored. The precipitate obtained by the addition of baryta to the oxalic infusion, contains the calumbic acid, which may be separated by suitable means.—Phar. Jour. Trans., June 3d, 1882, p. 995; from L'Orosi, v. 1.

Lycopodine.—A new alkaloid from *Lycopodium complanatum*, Lin., which see, under "Materia Medica."

Cascarilline—Preparation and Characters.—Dr. P. E. Alessandri has by the agency of oxalic acid succeeded in isolating the alkaloid "cascarilline," identical with that of Caventon and Duval, both economically and easily, the process being as follows: A certain quantity of coarsely powdered cascarilla bark is covered with a 2 to 3 per cent. solution of oxalic acid and allowed to stand for twelve hours, the mixture being frequently shaken. At the expiration of this period the temperature of the mixture is gradually raised to 140° F., after which it is allowed to cool. The liquid is filtered and the marc well pressed. The filtrate is saturated with ammonia and evaporated at a low temperature to two-thirds of its bulk, allowed to cool, and separated from any deposit that may have formed. It is then poured into a flask containing pure ether, the whole shaken gently for some time, allowed to stand for three hours or more, the ether decanted, distilled, and finally evaporated spontaneously. Pure white cascarilline is thus obtained. The following are the characteristics of the alkaloid as determined by the author, which correspond well with the limited number that have been given by Duval, except that Duval states it to be almost insoluble in *water*.

1. Soluble in *warm water*.

2. Crystallized.

3. Very soluble in ether and alcohol in the cold; slightly soluble in benzene, chloroform, and carbon disulphide.

4. Concentrated sulphuric acid colors it cherry red, which, after a quarter of an hour turns to a greenish violet, and afterwards to pure green.

5. Hydrochloric acid dissolves it, forming a rose-colored solution, which gradually changes to purplish-red, violet, green, and sky-blue, but without any addition of water (as proved by Duval).

6. Not decomposed by nitric acid.

7. Soluble in all acids not too much diluted. Forms crystallizable

compounds with some of them. The acetate is at first pasty, but it afterwards becomes crystalline.

8. The aqueous solution is extremely bitter, and is not precipitated by tannic acid.

9. The neutral hydrochloric solution is precipitated:
   a. By tannic acid in grayish-red flocks, and the supernatant liquid is violet by reflected light.
   b. With phosphomolybdate of sodium it gives a yellowish precipitate.
   c. Tincture of iodine turns it turbid.

10. Heated strongly it gives off an aromatic odor and melts.

11. Heated with potash it gives off ammonia.—Phar. Jour. Trans., June 3d, 1882, p. 993; from L'Orosi, v., 1.

Urea—Synthesis.—Mr. E. F. Herroun having noticed that a coil of platinum wire, heated to bright redness, when placed in a flask containing some benzene and ammonia, became covered with a white substance, and having modified the apparatus so as to produce a larger quantity of the product, the latter turned out, on analysis, to be urea.

In order to obtain as large a quantity of the substance as possible, he finally adopted another form of apparatus, in which two tubes containing heated platinum are used, and the product is collected in a central bulb.

Air enters a globular receiver by two opposite tubes, impregnated with ammonia and benzin vapor by bubbling through two bottles, containing strong ammonia solution and benzene respectively; the proportion of air which is admitted is regulated by two screw-clips. Another tube delivers air, dried by passing through a calcium chloride apparatus. This dry air removes the excess of ammonia and most of the carbonate of ammonium and water.

When this form of apparatus is used, all the ammonium cyanate generated is converted into urea. The maximum product is obtained when a slow current of air is passed through the ammonia and benzene, because if much air is used the benzene appears to be entirely converted into carbon dioxide and water.

The resulting urea is not pure, but mixed with ammonium carbonate and sulphate (derived from carbon disulphide in the benzene), and with an organic impurity apparently of a resinous nature, the presence of which, curiously, prevents the precipitation of urea by oxalic acid. This impurity is soluble in ether. To purify the urea, the solution which collects in the bulb is evaporated to dryness, the residue extracted with absolute alcohol, filtered, evaporated to a small bulk, and the urea precipitated by excess of ether. This should be repeated, or the urea may be recrystallized several times from alcohol.—New Rem., December, 1881, p. 357; from Jour. Chem. Soc., October, 1881.

Urea—Determination.—Of the different methods for the estimation of urea, that which depends upon the use of hypobromite of sodium has found most favor, and particularly the process of Hüfner among the many modifications of the method. Mr. C. Arnold has now subjected the different methods to critical examination, and finds that even Hüfner's method, which is regarded the best, is not suitable for accurate scientific investigation. The method of Liebig and Pflüger is the only one, in the author's opinion, that can be substituted for the direct determination of the nitrogen as urea.—Arch. d. Pharm., May, 1882, pp. 356–361.

Coniine—Preparation.—Dr. J. Schorm remarks that in spite of the increase in the consumption of coniine, the methods hitherto in use for preparing it yield an article which darkens on exposure to air, and the salts of which crystallize but badly. He gives the following method for preparing pure coniine and its salts:

A. 100 kilograms of hemlock-seed are moistened with hot water, and after swelling up are treated with 4 kilograms of carbonate of sodium (caustic alkalies cannot be used) previously dissolved in the requisite quantity of water. The swollen seed is worked up uniformly with shovels, and then placed in an apparatus of 400 kilograms capacity, similar to that used in the distillation of essential oils, and charged with steam under a pressure of three atmospheres. Coniine distils over with the steam, the greater part separating out in the receiver as an oily stratum, while a part remains dissolved in the water. The riper the seeds the greater the percentage yield of the oily coniine, and the sooner is the distillation ended. The distillate is neutralized with hydrochloric acid, and the whole evaporated to a thin syrupy consistence. When cool this syrup yields successive crops of sal-ammoniac crystals, which are removed by shaking the mass with twice its volume of strong alcohol, and filtering. The filtrate is freed from alcohol by evaporation on a water-bath, the approximate quantity of a solution of caustic soda is added, and the whole shaken with ether. The ethereal solution of crude coniine is then cooled down to a low temperature, whereby conhydrine, which is somewhat difficultly soluble in ether, crystallizes out. It is then further treated as under *C.*

B. The bruised hemlock-seed is treated in a vacuum extractor with water acidulated with acetic acid, and the extract evaporated *in vacuo* to a syrupy consistence. The syrup is treated with magnesia, and the coniine is dissolved out by shaking with ether. This method (*B*) yields a less percentage than *A*, but is of better quality.

C. The solution of crude coniine in ether, obtained by either of the above processes, is evaporated on a water-bath to remove ether, mixed with dry carbonate of potassium, and then subjected to fractional distillation from an air-bath. The portion distilling over at 168° to 169° C. is pure coniine, and represents 60 per cent. of the crude coniine.

Thus prepared, coniine is a colorless oily liquid, volatile at the ordinary temperature, and has a sp. gr. of 0.886. At a temperature of 25° C. it absorbs water, which it gives up again upon heating. It is soluble in 90 parts of water. The alkaloid, as well as its salts, which are crystallizable, is not affected by light.

The *hydrobromate of coniine*, $C_8H_{15}NHBr$, crystallizes in needle-shaped, or in large, transparent, vitreous crystals, unaltered by air or light.

The *hydriodate of coniine*, $C_8H_{15}NHI$, which must be prepared from hydriodic acid made from resublimed iodine (to get rid of traces of iron, which spoil the product), crystallizes in large, flat columns, likewise permanent.

The *bitartrate of coniine*, $C_8H_{15}N.C_4H_6O_6.2H_2O$, forms large magnificent crystals.—New Rem., December, 1881; Drug. Circ., September, 1881, p. 179; from Ber. d. Deutsch. Chem. Ges., 1881, p. 1765.

Conia—Constitution.—A. W. Hofmann, in studying the action of heat upon ammonium bases, has also thrown some light upon the constitution of conia. He considers that it has two hydrogen atoms more than the formula of von Planta and Kekulé demands. Hofmann gives it the formula $C_8H_{17}N$ or $(C_8H_{16}{}^{\prime\prime},HN$.—Am. Jour. Pharm., August, 1881, p. 401; from Ber. d. d. Chem. Ges., xiv., pp. 659–705.

Methyl-conia—Synthesis.—Michael and Gundelach have studied the reactions of paraconia, which Schiff first prepared synthetically from butyl aldehyde and alcoholic ammonia. They prepare it more advantageously from butylidene chloride. The base which they obtain by the treatment of this chloride with methylamine they consider to be identical with the methyl-conia, which von Planta and Kekulé found occurring in the hemlock along with conia. They hope, by the distillation of the hydrochlorate of this base in a stream of hydrochloric acid gas, to obtain conia.—Am. Jour. Pharm., August, 1881, p. 401; from Ber. d. d. Chem.

Nicotine—Estimation in Tobacco.—See *Tobacco*, under "Materia Medica."

Spigeline—A new Volatile Alkaloid.—W. L. Dudley has obtained this new alkaloid by distilling the ground root of *Spigelia marilandica* with milk of lime. The distillate is collected in hydrochloric acid, the solution evaporated to dryness, the residue exhausted with absolute alcohol, and the filtrate evaporated spontaneously. A small quantity of a crystalline substance remains, which is soluble in water, and gives with iodohydrargyrate of potassium a white crystalline precipitate, soluble in acids, alcohol, and ether, but insoluble in excess of the precipitant; by this reaction it is distinguished from other volatile alkaloids, nicotine, coniine, and lobeline, which give yellow precipitates with the iodohydrargyrate. With metatungstic acid spigeline gives a white precipitate.—Jour. Chem. Soc., December, 1881, p. 1153; from Am. Chem. Jour.

Cannabinine.—A new volatile alkaloid in *Cannabis indica*, which see, under "Materia Medica."

Ptomaines—Distinction from Plant Alkaloids.—General reactions, by means of which it may be readily and certainly decided whether a plant alkaloid or one of the so-called ptomaines is in question, have remained as yet unknown. The discovery of such must also remain for the present at least problematical, as long as the knowledge of the chemical nature of the ptomaines remains so deficient, and when under the latter designation an entire group of compounds is comprehended, the members of which, apparently, formed under the same conditions, exert a varying physiological action, and probably stand also in very loose chemical connection. Our interest, therefore, must be attracted the more to a recently published essay of Brouardel and Boutmy ("Comptes Rendus," 1881, pp. 92, 1056), wherein they maintain to have found in potassium ferridcyanide a reagent which will distinguish these two classes of bodies. Plant alkaloids, according to the statements of these chemists, do not change this salt, whereas the ptomaines reduce the same at once to potassium ferrocyanide, which may be recognized by a precipitate of Prussian blue on the addition of a ferric salt. An exception to the rule is morphine and veratrine, of which the former has a strong reducing action, the latter to a lesser extent.

The importance of this statement for forensic chemistry induced H. Beckurts to repeat the related experiments, but only with regard to the behavior of the plant alkaloids towards potassium ferricyanide, as the reducing action of the ptomaines has been emphasized by all investigators as a characteristic property, and therefore does not require a repeated confirmation by experiments.

The experiments were so conducted that for each a centigram of the alkaloid was dissolved in 5 cubic centimeters of water with the aid of dilute sulphuric acid, then 2 drops of a 10 per cent. solution of potassium ferricyanide added, and subsequently 1 drop of a very dilute neutral ferric chloride solution.

Morphine and colchicine reduced the potassium ferricyanide very strongly; the mixture, upon the addition of ferric chloride, became immediately dark blue. A less strong, but still plainly perceptible reduction, recognizable by the formation of a greenish-blue liquid after the addition of ferric chloride, and from which immediately, or after a short time, flocks of Prussian blue were precipitated, was effected by aconitine (English and German), brucine, conine, digitalin, nicotine, strychnine, papaverine, narceine, codeine, and, in accordance with the statements of the named chemists, veratrine. To these may also be added picrotoxin (in neutral solution), while atropine produced no reduction.

If it be accepted that the ptomaines, which, according to a recent investigation of A. Casali ("Gazz. Chim.," 1881, p. 314), are considered as amido acids, possess a stronger property of reduction than most alkaloids, it is seen from the communicated experiments that a distinguishing reaction between plant poisons and ptomaines with regard to their behavior towards potassium ferricyanide cannot be observed.

The author finally mentions that he is still occupied with the examination of the crystalline, or amorphous precipitates, which are produced by potassium ferricyanide and ferrocyanide with the alkaloids mentioned.—Am. Jour. Pharm., May, 1882, p. 221; from Archiv der Pharm., February, 1882, pp. 104–106.

Ptomaines—Recognition.—Brouardel and Boutmy assert that the ptomaines reduce ferricyanide of potassium, which the vegetable bases are unable to effect. P. Spica shows experimentally that this distinction does not hold good, and that the ferricyanide is reduced also by the vegetable bases.—Chem. News, January 20th, 1882, p. 36; from Gazzeta Chimica.

Ptomaines—Presence in the Inferior Animals.—A. Gautier, whom Selmi was pleased to recognize as the first chemist to affirm the existence of ptomaines in putrefying matters, has expressed the opinion that they result from a division of the albuminoid matters. He has searched for them among the products of secretion of certain animals which are provided with special glands, and has confirmed their presence in the venom of reptiles.

Pursuing the thought of the physiological formation of these bodies, the question arose whether the salivary glands of the superior animals would not produce toxic substances, analogous to the venom of serpents, and has indeed found in normal human saliva, a very toxic substance, particularly in its action upon birds, with which it produces intense stupefaction. It consists principally of a venomous alkaloid, forming a soluble and uncrystallizable chloro-platinate and chloroaurate, of the nature of the cadaver alkaloids.

Based upon the interesting results of Gautier, Mr. Schagdenhauffen has sought to disclose the presence of ptomaines in the inferior animals, selecting the comestible oyster and the common mussel as the subjects for experiment.

The animal, after having been detached from the shell, was deprived of the larger part of the tissue, in order to retain simply the central organ, the stomach and liver, upon which the experiments were made. The material was rubbed in a mortar with sand, which latter had been previously washed with acid and strongly ignited, and finally the organic material, after complete desiccation in a bath of salt-water, introduced into an apparatus for continual displacement, and treated with hot ether. The ethereal liquid, evaporated to the consistence of an extract, contained a notable quantity of fatty matter mixed with chlorophyll, the presence of which was easily disclosed, either by the aid of the spectroscope or by means of concentrated hydrochloric acid. The ethereal extract was then extracted with water, without the addition of an acid.

The aqueous solution, evaporated to a convenient quantity, presented all the characters of the cadaver alkaloids It gave a yellowish-white precipitate with potassio-mercuric iodide and potassio-cadmic iodide. Iodine in potassium iodide and the double iodide of bismuth and potassium, produced brown precipitates. Picric acid, phosphomolybdate of sodium, and tannin produced, likewise, abundant precipitates. Potassium ferricyanide, in contact with ferric chloride, gave rise to the formation of Prussian blue. Its hypodermic injection produced in the frog a stupefying effect, but without causing death.

These characters agree with those of the ptomaines; and the author concludes from the above reactions, that shell-fish contain bodies analogous to the vegetable alkaloids.

As to their origin, the author considers it difficult from the preliminary experiments to attribute their formation to a division of the albuminoid matters of the tissue, for nothing peremptorily demonstrates it; one would be able to refer them perhaps to a transformation of the alimentary bodies.

It would not be without interest to examine whether the production of ptomaines in animals is more abundant under certain physiological conditions than in others, or whether the toxic action of these bodies is more pronounced in summer than in winter. It is in order to elucidate this question that the author proposes to return again to the subject, after having investigated the reason, which is still the subject of controversy, why the consumption of oysters and mussels at certain seasons of the year is attended with danger.—Am. Jour. Pharm., May, 1882, p. 222; from Jour. de Pharm. d'Alsace-Lorraine, March, 1882, pp. 53–55.

Methyl-orange — A new Indicator in Alkalimetry. — Professor G. Lunge draws attention to methyl orange as an extremely sensitive indicator for strong mineral acids, which possesses also the advantage of not being affected by CO_2, H_2S and acetic acid. The substance was at one time best known as Poirrier's Orange, No. III, but has also been sold as "Helianthine," and as "Tropæoline *D*" It is in reality a salt of sulpho-benzene-azo-dimethylamine, for which Professor Lunge proposes the short and clear name "Methyl-orange." This compound imparts a yellow color to alkaline solutions, and turns pink with the slightest excess of a strong acid. The coloring-matter is so intense, that the slightest quantity must be added to the solution to be tested, else the change from the yellow color to pink is only gradual, and no sharp results are obtained. A very dilute aqueous solution is used, and only so much is added to the liquid as will adhere to the point of a rod. The transitions from yellow to pink, and from pink to yellow, are equally sharp. Owing to its extreme sensitiveness to mineral acids, the preparation of the substance, as a dye, has been discontinued; but at the author's suggestion it is now manufactured for analytical use by a Swiss firm.—Chem. News, December 16th, 1881, p. 288.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Salicin—Solubility and Decomposition by Heat.—Experiments made by Mr. R. H. Parker show the solubility of salicin in water to be one part in 28 parts, if it be employed at the ordinary temperature, or 24 parts if it be previously dissolved by heat. When salicin is heated with water, in the presence of a little glycerin, to above 300° F., it is decomposed, yielding a brown resin, salicylol, and other bodies. Similar products are yielded when salicin is submitted to dry distillation, and it seems therefore probable that the glycerin exerts no further influence than that of controlling the temperature. Heated in the presence of glycerin and water up to 300° F., no apparent change occurs.—Phar. Jour. Trans., November 5, 1881, pp. 378–379.

Asparagin—New Method of Determination.—F. Meunier has devised the following process, which depends upon the production of aspartate of potassa and ammonia when asparagin is treated with hydrate of potassium. The crushed, dried, and weighed substance is placed in a little bag with meshes small enough to retain the starch; this is placed in a porcelain dish, exhausted with boiling water, the filtered solution is heated with subacetate of lead to precipitate the albuminoids and lucein, and the excess of lead is removed from the filtrate by carbonate of sodium. The filtrate from the carbonate of lead is distilled with hydrate of potassium, and the ammonium collected and titrated as in Schloessing's method. When ammonium salts are present, these must be estimated separately.—Jour. Chem. Soc., August, 1881, p. 762; from Ann. Agronomiques.

Thevetin—A Glucoside occurring in Thevetia nereifolia, which see, under "Materia Medica."

Adonidin—A New Glucoside from Adonis vernalis.—Cervello has discovered a poisonous glucoside in the leaves of *Adonis vernalis*, which acts specially on the heart. The description of this substance agrees closely with that of Husemann's *helleborin*, but the solubilities of the two substances differ materially.—Chem. Jour., June 16, 1882; from Phar. Zeitschr. Russ., May and June, 1882.

Vanillin—Production from Oil of Cloves.—The following method is given for producing artificial vanillin from essential oil of cloves. The oil is diluted with three times its volume of ether, and agitated with a very dilute aqueous solution of potash. An alkaline solution of eugenol is formed, which is separated, the alkali neutralized by acid, and the eugenol dissolved in sufficient ether. The ether is distilled off, and the eugenol treated by anhydrous acetic acid. The aceto-eugenol thus formed is oxidized by a weak and warm solution of permanganate of potash. The product is filtered, rendered slightly alkaline, and concentrated. Lastly, it is acidulated and agitated with ether to remove the vanillin.—Chem. and Drug., October, 1881, p. 442.

Heliotropin—Isolation in Crystals.—According to "Droguisten Zeitung" (August 19, 1881) Messrs. Schimmel and Co. of Leipsic, now prepare pure *heliotropin* in crystals, with the identical pleasant odor of the heliotrope (*Heliotropium peruv.* or *H. grandiflor*). It is soluble in oils, alcohol, and fats, which renders it suitable for preparing perfumes and scenting oils and soaps. A small quantity of heliotropin goes a long way, 5 grams being sufficient for 1 kilogram of alcohol, oil or soap. Put up in well-closed bottles it keeps well, but it is best to store the bottles containing it in a cool dark place.—Chem. and Drug., September, 1881, p. 396.

Cantharidin—Substitution for Cantharides.—A writer in Phar. Zeitschr. f. Russl. (1882) observes that cantharidin is rapidly coming into use on the European continent as a substitute for powdered cantharides in blisters and plasters. In practice it is found that one part of cantharidin is equal to two hundred parts of the powdered insect. Formulas are given for cantharidized collodium, plasters and ointments, which will be found under "Pharmacy."—Chem. Jour., June 16, 1882, p. 371.

Bergenin—A New Bitter Principle from Saxifraga.—Messrs. Garreau and Machelast have isolated from different species of *Saxifraga* (*S. sibirica*, *S. cordifolia*, and *S. crassifolia*) a crystallizable bitter substance, which they have named "bergenin." It is obtained by boiling the stems of the respective plants with absolute alcohol, after the tannin has been removed by ether. It crystallizes in alcohol in the form of fine colorless tetrahedrons, has a bitter taste, resembling coffee and quinine, melts at 140°, and burns up completely at 300°. It is soluble in 167 parts of 90 per cent. alcohol and in 830 parts of water, but is more soluble in these liquids at a boiling temperature; is faintly acid to litmus, and is not changed by treatment with dilute sulphuric or hydrochloric acid, but by dilute nitric acid is converted into oxalic acid. Concentrated sulphuric acid decomposes it; with potassa, lime, baryta and magnesia it forms soluble salts. Its formula is given as $C_6H_3O_3.H_2O$. The authors have found the new substance to possess valuable nervine-tonic properties, being intermediate in its action between salicylic acid and quinine. Their experience proves that the above-mentioned species of *saxifraga* thrive well in ground that is suitable for the cultivation of sugar-beets and cereals, and, inasmuch as 8000 parts of the dry stems will yield nearly 200 parts of bergenin, besides 1500 parts of tannin, the authors are of the opinion that the new substance has a bright future before it.—Arch. d. Pharm., October, 1881, p. 293; from Wien. Med. Ztg., 1881, No. 22.

Tanacetin—Characters, etc.—See *Tanacetum vulgare*, under "Materia Medica."

Superbin.—A neutral substance from *Gloriosa superba*, which see, under "Materia Medica."

Omphalocarpin.—A neutral principle from *Omphalocarpum procera*, which see, under "Materia Medica."

Porphyroxin.—Its presence characteristic for India opium in forensic analysis. See *India Opium*, under "Materia Medica."

COLORING MATTERS.

Indigotin—Direct Formation upon Textile Fabrics.—Mr. Rosenstiehl, after giving an account of the researches of Baeyer (see Proceedings, 1881, p. 355), states that by means of ortho-nitro-phenyl-propiolic acid indigotin may be formed directly upon the tissue. He produced a piece of calico upon which had been printed a mixture of gum-water, containing the above-mentioned acid along with carbonate of soda and glucose. The design is scarcely visible at first, all the substances being colorless. But if the cloth is exposed for two minutes to a temperature bordering upon 100°, the design appears, and the formation of indigotin is so plentiful that the color appears black. Washing with water removes the soluble matter, and indigo-blue becomes visible with all its characters, and is intimately fixed upon the fibre.—Chem. News, August 5, 1881, p. 72.

Indigo, and its artificial production, is the subject of a very exhaustive paper, read by the President of the Chemical Society, Mr. H. E. Roscoe, before the Royal Institution of Great Britain, which is published in Chem. News, July 29, August 5, and August 12, 1881, pp. 53–54, 67–69, and 74–75.

Artificial Indigo—Manufacture.—The following interesting description of the manufacture of artificial indigo at the Baden Aniline and Soda Works, is given in "Chem. and Drug.," from a letter by Prof. Baeyer, the discoverer, to Prof. Roscoe, and may find place here.

The manufacture of artificial indigo depends on the preparation of ortho-nitro-phenyl-propiolic acid, known in commerce as propiolic acid. The first necessity in its preparation is a cheap cinnamic acid. This is now made by the Baden company by fusing benzol chloride with sodium acetate, dispensing with the use of acetic anhydride and oil of bitter almonds. "I was amazed to see hundred-weights of cinnamic acid undergoing treatment with nitric acid, for I remembered how difficult it was to work up a single pound in the laboratory." Cinnamic acid is converted into ortho-nitro-cinnamic acid in two processes. First it is converted into its ethyl ether, which is then treated with a mixture of nitric and sulphuric acids, certain precautions being observed. The solid mixture of ortho- and para-nitro-ethers thus obtained is heated with alcohol, the ortho-ether being dissolved and deposited from alcoholic solution in large yellowish crystals. This, on saponification, yields ortho-nitro-cinnamic acid. The propiolic acid is obtained from this by treatment with bromine, by which means the dibromide is formed, which is then dissolved in caustic soda lye with the formation of sodium propiolate. The acid itself is precipitated from the solution of the soda salt by means of an acid, and is sent to market as a paste containing twenty-five per cent. of acid. The acid is what is used by the dyer. A mixture of propiolic acid and sodium xanthate, properly thickened, is printed on the cloth. Exposure to the air (aging) develops the color, which is fast, and exhibits the characteristic tints of indigo in both light and dark shades.

The process works with perfect regularity, the only serious imperfection being the loss of forty per cent. of cinnamic acid in the form of para-nitro-cinnamic acid Still, 200 kilos of paste are turned out daily, which is sold at 10*s*. a kilo.—New Rem., April, 1882, p. 113.

Indigotin—Determination in the Indigos of Commerce.—A. Damoiseau prepares a liquid containing 100 grams syrup of glucose, 500 c.c. of water, and alcohol enough to make up a liter. 1 gram of the indigo in question, finely ground, is placed in a flask fitted with a cork, through which passes a tube drawn out to a point. A mixture of 10 c.c. of soda lye at 45° (Baumé?), 10 c.c. of water, and 10 c.c. of alcohol (in which mixture the soda lye has given neither precipitates nor turbidity), is then added, and, after agitation with the indigo, 30 c.c. of the saccharine liquid are introduced, the flask is corked and heated on the water-bath, stirring from time to time. In less than twenty minutes the reduction is complete, and the liquid has become of a fine light-yellow color; it is then requisite to filter through a plug of cotton, placed at the lower end of a tapering tube, wide enough to receive the whole of the liquid at once. The filtration is conducted with the aid of an aspirator. A current of some inert gas, *e. g.*, coal-gas, is allowed to enter at the upper end to prevent oxidation. A rather rapid current of air is then passed through the filtrate, and in two hours the whole of the indigotin is precipitated in a state easy to wash. It is placed on a filter, washed with alcohol at 40 per cent., dried at 100°, and weighed.—Chem. News, August 12, 1881, p. 81; from Jour. de Pharm. et de Chim.

Pseudoindican, and
Thevetin Blue—Occurrence and Characters.—See *Thevetia nereifolia*, under "Materia Medica."

Litmus—Permanent Solution.—Various formulas have from time to time been proposed in the journals for obtaining a permanent litmus solution, which appear, however, more or less circumstantial. "H. K." gives a method for obtaining a solution which may be preserved for months in a vessel closed with paper, or even with a cork. The litmus solution is first prepared according to the suggestion of Mohr, "Lehrbuch der chem.-analyt. Titrirmethode." p. 73, and subsequently evaporated at a temperature of 90° C. to dryness; if the obtained residue is then dissolved in a little glycerin, a solution is obtained which remains permanent for months, and its sensibility is in no wise influenced. By its application it is only necessary to dip a glass rod into the solution, which amount suffices for tinting any required amount of liquid.—Am. Jour. Phar., May, 1882, p. 220; from Phar. Ztg., No. 16, 1882. p. 117.

Kæmpferide—Characters and Composition.—Mr. E. Jahns has carefully examined kæmpferide—a substance extracted by Brandes (1839) from galangal (*Kæmpferia Galanga*)—and finds that this substance is by no means of so simple a nature as Brandes then supposed, but is composed of at least three bodies, which the author terms respectively "*Kæmpferide*," "*Galangin*." and "*Alpinin*." Of these three substances he has at present only studied kæmpferide, and reserves a description of the others for a future paper.

Kæmpferide ($C_{16}H_{12}O_6$) crystallizes in pale-yellow flat needles, melts at 221° to 222° C., and upon raising the temperature carefully it sublimes in part without decomposition. It is almost insoluble in water, soluble in 400 parts of 90 per cent. alcohol when cold, and more readily when hot; it is also soluble in ether and in glacial acetic acid, and to some extent in boiling chloroform and benzol. Alkalies dissolve it with an intense yellow color; and concentrated sulphuric acid dissolves it with a yellow color, forming a solution which after standing a while exhibits fluorescence. Fuming sulphuric acid, added in slight excess, dissolves it with a gray color, which upon further addition of the acid passes over into wine-red. Alcoholic solutions of kæmpferide are colored green by ferric chloride, and precipitated by lead acetate. Solutions of silver salts, or alkaline copper salts, when heated with kæmpferide, become reduced. Kæmpferide is not decomposed when boiled with dilute acids. Beyond this Mr. Jahns has studied several other reactions of kæmpferide, and finds a great resemblance between it and a number of natural yellow coloring matters, or such as can be prepared from glucosides, especially quercetin, rhamnetin, and morin.—Chem. and Drug., December, 1881, p. 528; from Ber. d. d. Chem. Gesel., November 14, 1881.

Mr. Jahns has now communicated further observations on "Kæmpferide," and describes also the other crystallizable yellow coloring substances "Galangin," and Alpinin."

Galangin crystallizes from absolute alcohol in light-yellow flat columns, or when rapidly crystallized in narrow six-sided tables, which contain ½ mol. of alcohol of crystallization and soon effloresce in the air, becoming opaque. From 70 to 80 per cent. alcohol it crystallizes in form of yellowish-white, silky, glistening needles, which retain 1 mol. of water of crystallization. Melting-point 214°–215°; with care may be sublimed unchanged; odorless, tasteless, nearly insoluble in water, readily in ether, in 34 parts of absolute, and in 68 parts of 90 per cent. alcohol at 15 per cent; with difficulty soluble in boiling benzol; and very sparingly in boiling chloroform. Its reactions are similar to those of kæmpferide. Composition $= C_{15}H_{10}O_5 + H_2O$; the alcoholates $= C_{15}H_{10}O_5 + \frac{1}{2}C_2H_6O$. Distinguished from kæmpferide by its behavior to concentrated sulphuric acid; both form yellow solutions, but that of kæmpferide is fluorescent, and that of galangin is not. Fuming sulphuric acid dissolves kæmpferide with green color turning to red; galangin dissolves with unchanged yellow color.

Alpinin crystallizes in yellow needles, and has a composition corresponding to $C_{17}H_{12}O_6$. It resembles kæmpferide in all of its characters and reactions, with the exception of its lower melting-point, (172°–174°) and the readier solubility.—Arch. d. Pharm., March, 1882, p. 161–180.

Curcumin—Preparation and Characters.—J. L. Jackson has obtained curcumin from Bengal turmeric root by extraction with ether, the oil having previously been removed by bisulphide of carbon. The crude curcumin is purified by washing with cold and crystallizing from hot alcohol. Curcumin crystallizes in yellow prisms (m. p. 178°). Analyses of the compound give numbers agreeing with the formula

$C_{28}H_{26}O_8$. Daube found $C_{10}H_{10}O_3$, and Gagewsky and Kaehler give $C_{16}H_{16}O_4$.—Jour. Chem. Soc., July, 1881, p. 611; from Ber. d. d. Chem. Ges.

ALBUMINOIDS.

Crystalline Albuminoids—Occurrence in Hemp and Castor Seeds.—H. Ritthausen has made observations similar to those of Gruebler, who described crystallized albumen from pumpkin seeds. By exhausting the press-cake of hemp seed with a warm 5 per cent. solution of chloride of sodium handsome octahedral and rhombic dodecahedral crystals were obtained, the substance being probably identical with that from pumpkin-seeds. A similar result was obtained from the press-cake of castor-oil seeds; but neither the seeds nor the press-cakes of ground-nuts, sunflower seeds, hazel-nuts or Brazil-nuts yielded albumen in a crystalline form.—Am. Jour. Phar, August, 1881, p. 393; from Chem. Ztg. and Jour. prakt. Chem., xxiii., 481.

Albumen—Trichloracetic Acid as Reagent for its Presence in Urine.—A. Raabè recommends for the rapid and certain determination of albumen in urine, that a small crystal of trichloracetic acid be dropped into 1 c.c. of the clear, filtered urine, contained in a test-tube. It is then set aside for a short time without shaking. The acid soon dissolves, and at the junction of the two layers a sharply defined, clearly visible, turbid zone is produced if albumen is present. No such reaction occurs in normal urine; but if a large quantity of urates is present a turbidity is produced, which soon spreads throughout the liquid, and disappears again on heating, whereby it is easily distinguished from the albumen reaction. Mr. Raabe has made comparative experiments which lead him to believe that the new reagent is even more sensitive than metaphosphoric acid, recommended by Hindenlang for the same purpose.—Arch. d. Pharm., October, 1881, p. 300; from Phar. Zeitschr. f. Russl., 1881, No. 20.

Albuminate of Iron—Preparation.—The following formula has been adopted by the Dutch Society for the Advancement of Pharmacy: Dry white of egg, 10 parts (equal to about 40 parts of ordinary white of egg*); solution of chloride of iron (sp. gr. 1 480), 24 parts; distilled water, q. s. Dissolve the white of egg in 1000 parts of distilled water, let the solution stand 12 hours and filter. Then add to it the solution of chloride of iron diluted with 240 parts of water. Shake the mixture thoroughly and evaporate it to a syrupy consistence at a temperature not exceeding 40° C. Spread the syrupy liquid on plates of glass, and expose them to a temperature not exceeding 40° C. The product is in the form of transparent, golden-yellow scales, containing 3.34 per cent. of iron, and easily soluble in water, after the addition of a little hydrochloric acid.—New Rem., January, 1882, p. 10.

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* Ordinary egg white contains only about 12.5 per cent. of dry egg white; hence 10 parts of the dry are more nearly equal to about 80 parts of the ordinary.—REP.

Albuminate of Iron—Causes of Variability.—Mr. G. Buchner has made a series of experiments to determine the behavior of ferric chloride to albumen. If a clear filtered solution of albumen (1 : 10), is treated with dilute solution of ferric chloride (1 : 20), a voluminous precipitate is formed, which is again dissolved, on further addition of the precipitate, a clear red-brown liquid resulting. If the ferric solution has been added in quantity just sufficient to redissolve the precipitate, and the clear solution is then evaporated at 50° C., or less, a gelatinous mass is formed, which may be completely dried on plates. The brown-red powder, or transparent lamella, have the following composition: Iron, 2.193; chlorine, 7.980; albumen, 89.827. The substance is only partially soluble, and when treated with water leaves a residue, which, when dried at 50° C., gave: Iron, 1.488; chlorine, 2.700; albumen, 95 812. The original solution is coagulable by heat, and gives indication of iron and of chlorine to reagents. When allowed to stand it gradually becomes turbid, and separates into a jelly and a light-yellow clear liquid. The gelatinous mass, collected on a filter, drained, pressed, and dried at the ordinary temperature, yielded a powder which was completely soluble in water, and had the composition: Iron, 0.998; chlorine. 4.531; albumen, 94.471. The solution is not coagulable by heat, gives no reaction with nitrate of silver, but by the addition of acids albumen is precipitated; solution of common salt, and solution of sulphocyanide of potassium produced light-yellow precipitates of albuminate of iron. The original solution of albuminate of iron, when treated with a saturated solution of salt, yields a precipitate, which when pressed, washed with water until the washings no longer indicated chlorine, and dried, had the composition: Iron, 1.703; chlorine, 1.680; albumen, 96.617. The dry powder is not at once soluble in water, but on standing forms a jelly, and finally dissolves. Owing to this property the above precipitate must be washed very rapidly, by placing the expressed mass into a tall cylinder, shaking with water, and immediately decanting. The solution gives no reaction with nitrate of silver; solution of sulphocyanide precipitates albuminate of iron in form of a light-yellow precipitate. When the original solution is treated with a large excess of ferric chloride, and then precipitated with chloride of sodium, etc., a product is obtained which is in all respects similar to the above. Like that, it is clearly dissolved by water, and the solution is not coagulable by heat, etc. An albuminate of iron, obtained by precipitating the original solution with excess of ferric chloride alone, had the composition: Iron, 1.21; chlorine, 4.48; albumen, 94.27. By subjecting the original solution to dialysis, ferric chloride and a small quantity of albumen passed through the membrane, and an albuminate remained on the dialyzer, which had the composition: Iron, 1.15; chlorine, 0.510; albumen, 97.775. It forms a perfectly neutral solution, which was readily filtered, and remained perfectly clear even after long boiling. The author's results show a great variability in the products resulting by different treatment, and that an albuminate of iron of constant composition probably is not obtainable.—Arch. d. Pharm., June, 1882, p. 417–421.

Albuminated Ferrous Borotartrate—Preparation, etc.—Mr. Carlo Pavesi gives the following process for preparing the above compound, which is stated not only to possess sedative properties, but to act also as an antiseptic and antifermentative. According to the author its chemical composition is that of an albuminated borotartrate of protoxide of iron. Into a suitable porcelain capsule place 1 part each of finely powdered boric and tartaric acids, 2 parts of pure and fine iron filings, and sufficient water to convert the whole into a liquid. The mixture is heated to a temperature which gradually increases from 176° F. to 212° F., at which point the capsule is taken off the fire and the mixture is allowed to cool. Six parts of fresh egg albumen are then added and the whole well mixed until it is reduced to a homogeneous mass. It is then set aside for a week in a place where the temperature does not exceed 76° F., the mixture being stirred from time to time, so as to insure the chemical combination of the tartaric and boric acids and the albumen. At the end of this time the mixture is filtered through paper, more water being added, if necessary, to render the filtration less difficult. The liquor is then evaporated at a temperature not exceeding 95° F. to dryness, the residue is finely powdered and preserved in well-stoppered bottles. Albuminated ferrous borotartrate forms then a light straw-colored powder of a not disagreeable taste, free from the styptic flavor of so many preparations of iron; it is inodorous and soluble in water.—Pharm. Jour. Trans., April 22, 1882, p. 864; from Annali di Chimica, January, 1882.

Tannate of Albumen—A New Form of Administering Tannic Acid.—As a practical result of his investigations on the efficacy of tannic acid, Dr. L. Levin recommends a new form for its administration. It has been proved by experience that a solution of tannic acid, and still more the substance itself in powder, not seldom fail to produce the desired effect, or that they produce collateral effects which are not sought for, or objectionable, such as loss of appetite, coated tongue, feeling of weight in the epigastrium, etc.

These untoward effects may be avoided by giving the substance in form of tannate of albumen (or tannin-albuminate). On adding to a 1 or 2 per cent. solution of tannin a filtered solution of the white of 1 egg in 100 c.c. of water, and shaking the mixture, there results an opalescent, slightly milky fluid, which has a much fainter astringent taste than the corresponding pure solution of tannin. The author states that even in the case of infants of only a few weeks of age, the above mixture, suitably diluted, has produced very good results.—New Rem., January, 1882, p. 9; from Pharm. Post, 1881, p. 427.

Milk—Reactions.—Dr. C. Arnold gives the following reactions of milk: Fresh milk yields with tincture of guaiacum, in a few seconds, a blue color; the reaction appears at once if the milk is carefully heated to from 40° to 60° C.; but it is not produced if the milk was heated to 80° C., or to boiling. Sour milk also shows the reaction; but mineral acids and caustic alkalies prevent it. The reaction is due to the presence of ozone in fresh milk. Tincture of guaiacum yields also a blue color with the emulsions of oils of poppy, olive, ricinus, and flaxseed.

Fresh as well as boiled milk is capable, like blood-corpuscles, of transferring ozone. A mixture of starch-paste, potassium iodide, and milk in contact with old oil of turpentine, at once turns blue at the point of contact, the zone becoming rapidly broader. After boiling the milk for some time the color appears only after several minutes.

Fresh milk, freed from casein by acetic acid, if mixed with potassa solution and a trace of copper sulphate, does not yield the violet reaction characteristic of peptones; but after the milk has been kept for over twelve hours, the reaction appears, and the gradual increase of peptone is indicated by the deeper violet color.—Amer. Jour. Pharm., February, 1882, p. 61; from Archiv d. Pharm., July, 1881, p. 41, 42.

Milk—Cause of Blue Appearance.—According to the investigations of Mr. F. Neelson, the blue appearance which milk sometimes presents after standing a few days is due to an organism which is allied to bacteria, and can be transplanted into other samples of milk and various solutions. It thrives, according to the proportion of acid present and the condition of the casein; it appears after a certain degree of acidification has taken place, and prevents the further formation of acid. The casein must be unchanged; it is then held in solution during the bluing process, which occurs only in presence of oxygen, and is attended with evolution of carbonic anhydride.—Pharm. Jour. Trans., December 10, 1881, p. 480; from Bied. Centr., 1881, pp. 418–422, in Jour. Chem. Soc., November, 1881.

Gluten—Determination in Flour.—Messrs. Bénard and Girardin draw attention to the important observation made by them, that the time consumed between the formation of the dough and its further manipulation for gluten has a decided influence on the yield. Thus, Bénard, operating with three samples of flour, made dough with 50 grams of water and 100 grams of each of the samples. Operating in the well-known manner, with one-third part of each at once, after one-half hour, and after three hours, he obtained the following yields of gluten:

Sample.	At once.	After 30 minutes.	After 3 hours.
1, . . .	24.40 per cent.	27.40 per cent.	30.80 per cent.
2, . . .	26.20 "	29.20 "	31.20 "
3, . . .	22.00 "	28.20 "	28.40 "

The third sample seems to have been a moist quality of flour, which accounts for the more rapid separation of the gluten.

Girardin repeated the experiments in the same manner, and obtained very closely corresponding results. The authors are, in view of this, of the opinion that the process of separating gluten from flour should be interrupted for three hours after the dough has been started. —Archiv d. Pharm., November, 1881, p. 370; from Jour. d. Pharm. et de Chim. (5), iv., 127.

Yeast and Fermentation.—The following abstract of a paper by Hayduck in "Dingl. Polyt." I. (240. 391–401) is taken from "Journ. Chem. Soc.," October, 1881, pp. 928–930: Hayduck has investigated the action of Rochelle salt on the fermentative power of yeast, and although Mayer states that this salt accelerates the fermentation of a concentrated solution of sugar, Hayduck found it to produce slow fermentation. In concentrated solutions the fermentative power of yeast is decreased, but it does not wholly disappear even in solutions of the highest concentration. With regard to the temperature necessary for the souring of yeast, Delbrück gives 50°, which should be maintained for about 20 hours, and should not be reduced until the acidification is complete. In order to determine the actual yield of yeast in the preparation of the latter, Hayduck mentions that the quantity of water in pressed yeast containing starch varies as much as 10 per cent.; pure pressed yeast yields as a mean 73.5 per cent. of water. To obtain the actual quantity of yeast from the quantity of water contained in yeast contaminated with starch, it is necessary to be in possession of accurate numbers, giving the quantity of water in pressed yeast and moist starch, in the state in which it is found in yeast. For pressed yeast 74 per cent. may be taken. Geissler estimates the value of different qualities of yeast as to fermentative power by adding to 3 to 4 grams of yeast 100 c.c. of a 10 per cent. solution of sugar. The mixture is kept at a temperature of 25° to 30° for an hour, and the quantity of carbonic acid evolved is determined. Besides gypsum, starch forms the chief adulterant of yeast. The quantity of starch is determined by its conversion into sugar. It has been proposed to separate starch from yeast by elutriation. the former depositing more readily than the latter. According to Hayduck the variable fermenting power of yeast depends mainly on the quantity of starch contained in the pressed yeast, but also on the different constitution of the yeast-cells, and the percentage of protein substances present. The durability of yeast is influenced in two ways. Certain qualities can be pressed only with great difficulty; they remain soft and do not assume the normal consistency characterizing pressed yeast. Others assume their normal consistency at first, but afterwards become soft and give off an offensive odor, a circumstance due to the formation of bacteria in the malt or rye used in mashing. It is therefore recommended to increase the degree of acid fermentation and the temperature in the mash. For the preparation of yeast Werner and Krüger give a temperature of 60° to 61°. According to Stumpfeldt, all substances which form a gelatinous mass at a temperature not higher than that at which the protein substances are coagulated, can be used tor preparing yeast. In the preparation of pressed yeast the largest yield is obtained when the formation of yeast is completed in the first operation, called the "main fermentation," as here the strongest evolution of carbonic acid takes place. Märker has investigated the influence of various substances on fermentation. There is an increase of yeast when acetic acid is absent; when present in yeast to the extent of 0.6 per cent. the growth of the latter ceases. The same is the case with butyric acid. Lactic acid, however, increases the yield. Rainer prepares pressed yeast without vinous fermentation, by extracting the albuminous substances from cereals, maize, leguminosæ, bran, etc., with 15 to 20 times the quantity of slightly alkaline water, and peptonizing with about 4 per cent. lactic acid, or 0.25 per cent. phosphoric acid, or 0.4 per cent sulphuric or hydrochloric acid at 38° or 40°, or by macerating these substances with the above acids in weak solutions, and converting into peptones with the addition of 1 part dried malt for 1 part by weight of dry albuminous substances.

Alcohol Ferment—Physiology and Morphology.—E. C. Hansen has made researches on the physiology and morphology of the alcohol ferment.

Saccharomyces Apiculatus.—This is marked by a distinct form, and hence easily to be found at all times of the year. Ripe and juicy fruits are the home of this ferment, where it develops, and whence it is carried about by the wind; it is found but seldom on the ground. It is washed off by rain or is borne to the ground by falling fruit, where it winters, becoming active again in the following season. The ferment develops in two forms, one lemon-shaped, the other more oval in outline. The first is developed soonest, but the second kind, although later, is the most abundant. *Saccharomyces apiculatus* is much less energetic than *S. cerevisiæ*. It is incapable of inverting saccharose, but is very retentive of life, resisting easily all effects of temperature and moisture. It develops most rapidly in the presence of *S. cerevisiæ*, so much so that the action of the latter is retarded.—Jour. Chem. Soc., January, 1882, p. 80; from Bied. Centr., 1881, pp. 558–560.

Pressed Yeast—Examination.—In the examination of pressed yeast E. Geissler recommends the determination of the yeast in addition or instead of the determination of starch, ash, and moisture. 3 or 4 grams of the sample are stirred in water, diluted, and heated to complete coagulation. Then a few drops of hydrochloric acid are added, and heated until iodine no longer gives a blue color with a drop of the liquid. The coagulated yeast is then washed by decantation, finally transferred to a tared filter, dried, and weighed.—Journ. Chem. Soc., December, 1881, p. 1183; from Chem. Centralbl.

Diastase of Kôji—Characters.—R. W. Atkinson communicates the results of an investigation into the nature of the material used in Japan for converting starch into sugar in brewing operations (see Proceedings, 1879, p. 402). This substance, "kôji," is prepared from steamed rice by allowing the spores of a fungus, mixed with the grain, to vegetate over the surface. The change is attended with great evolution of heat, and the rice suffers a loss of 11 per cent., calculated on the substance dried at 100°. A solution of the soluble portion of the kôji thus prepared possesses properties analogous to those of malt-extract, although differing from the latter in some important respects. It rapidly inverts cane-sugar and hydrates maltose and dextrin. It liquefies starch paste, forming at first maltose and dextrin, but giving as ultimate products dextrose and dextrin. The principal change produced in the rice-grain by the growing fungus is to render the insoluble albuminoids previously existing in the rice soluble. The chief use of kôji is in the production of *Saké*, the alcoholic liquid which is everywhere consumed in Japan, and which is prepared from steamed rice. Kôji is also employed in breadmaking and in the preparation of the well-known sauce "Soy," which is likewise a product of fermentation, although its preparation is much more complicated and has not yet been explained.—Journ. Chem. Soc., November, 1881, p. 1059; from Proc. Roy. Soc., 32, pp. 299–332.

Diastase—Influence of Foreign Bodies on its Efficacy.—Mr. J. Kjeldahl finds that small portions of acid augment the action of diastase, but a slight increase proves injurious. The smallest proportions of alcohol check the effects of diastase, and its action is injurious.—Chem. News, July 15, 1881; from Biederm. Centralbl., ix., No. 9.

Diastatic Ferment in Egg Albumen.—F. Selmi observed that a filtered aqueous solution of albumen, on being digested with a solution of starch, converts the latter into sugar. The ferment is not precipitated from the aqueous solution by alcohol, and may be obtained in the solid condition by evaporation at a low temperature.—Am. Jour. Phar., June, 1882, p. 302; from Monit. Scient., xii., 79; Chem. Ztg., 1882, p. 47.

Pepsin—Test.—Mr. F. Baden Benger finds that the Br. Phar. process for testing pepsin is unnecessarily tedious, and the conditions imposed are too indefinite to yield satisfactory results. To remedy the defect of tediousness, Mr. Benger suggests that the temperature be raised to 130° F., at which point the action of pepsin is very much more rapid than at 98° F. The division of the coagulated white of egg should also be more definitely described than as "in thin shavings," and should be as fine as possible. The method first suggested by Mr. Dowdeswell (see Proceedings, 1881), which consists in pressing the coagulum through the meshes of a sieve, is recommended, a wire gauze composed of No. 32 Birmingham wire gauge brass or copper wire, and containing 36 meshes to the linear inch, being as fine as can be conveniently used, and answering admirably. The acidulated water should contain 0.3 per cent. of real HCl. Operating under these conditions pepsins may be tested in twenty minutes or half an hour with more accuracy than by the (Br.) Pharmacopœia process, occupying four hours. The details of the process are given in Yearbook of Phar., 1881, pp. 417–419.

Pepsin—Use in Seasickness.—In a number of cases pepsin has proved effectual for the prevention of seasickness in passengers who had not made a seavoyage before. When the first symptoms appeared, pepsin, sufficient to cover the point of a knife, was taken, followed by a glass of water acidulated with 5 drops of hydrochloric acid. The dose was repeated several times a day, more especially before and after meals. The favorable results obtained invite to further trials.—Amer. Jour. Phar., June, 1882, p. 310; from Phar. Ztg., 1882, No. 20; Ind. Blätter.

Papayotin (Papaïne)—Digestive Action.—Different authors have spoken very highly of the digestive properties of this substance (see Proceedings, 1881. pp. 366–367), but according to the experience of Professor Eulenberg (Allgem. med. Centralzeit.) its properties in this respect have been very much overrated. The preparations examined by him were not only insoluble in alcohol and ether, but also in cold or hot water and in glycerin; on addition of acid only a small proportion dissolved. Numerous experiments have determined that it possesses neither solvent nor peptonizing influence upon albuminates; even after immersion in aqueous and glycerin papayotin liquids coagulated albumen remained nearly unchanged. Dr. E. Geissler has also made numerous experiments, with almost the same results. A small percentage of egg albumen only was dissolved in each case, and in no case amounting to 2 per cent. The papayotin was employed in these experiments in the manner that is usual for pepsin preparations.—Arch. d. Phar., December, 1881, p. 443; from Pharm. Centralh., 1881, No. 45.

Peptone—Preparation and Forms of Administration.—In a former investigation, A. Pettit had shown that peptic peptones differ from pancreatic peptones. Having since made a certain number of comparative experiments, he now offers the following process, for the preparation of a peptic peptone, which he has named

Pepsin-chlorhydric Peptone.—One kilogram (2 pounds) of beef, freed from fatty matters and tendons, is cut very fine, and digested for twelve hours at a temperature of 50° C. (122° F.) in 6 liters (12 quarts) of water, acidified by hydrochloric acid (4 gm. or 60 grains of the acid per liter or quart). The quantity of pepsin to be added varies according to its activity. In general, about 10 gm. of pepsin, prepared according to his process from the hog's stomach, is sufficient. After the lapse of twelve hours, the mixture is strained, allowed to cool, and then passed through a wetted filter, so as to retain the fatty matters. The solution should not be rendered turbid, or precipitated by nitric acid. It is next exactly neutralized with bicarbonate of sodium, and evaporated to dryness on the water-bath. The yield is 250 grams = 25 per cent. of the weight of the beef used. The only objection to this form is the presence of a considerable quantity of salt, which is obviated by substituting tartaric acid and manipulating as below, thus forming

Pepsin-tartaric Peptone.—Four grams of tartaric acid are substituted for the hydrochloric acid in the above process. As soon as the peptonization is complete, the liquid is filtered as before, and the filtrate divided into two equal portions, one of which is saturated with bicarbonate of potassium. This is then mixed with the reserved portion, and causes the formation and precipitation of cream of tartar. After again filtering, the liquid is concentrated to a syrupy consistence and allowed to cool. On standing, nearly all the cream of tartar still retained will be deposited. The clear solution is then poured off, and evaporated to dryness on the water-bath.

The "pepsin-tartaric peptone" thus prepared contains only a minute quantity of cream of tartar, and yields a much better-tasting preparation (wine, elixir, syrup, etc.) than those containing hydrochloric acid.

The peptones obtained in either way may be administered in the form of *wafer capsules*, each containing 1 gram, and in this form preserved unaltered; or it may be given in the form of *elixir*, *syrup*, or *wine*, formulas for which will be found under "Pharmacy." But for these latter forms the "pepsin-tartaric peptone," on account of its freedom from salt, is to be preferred.

Mercuric Peptone, which has been used in syphilis with success by Dr. Joseph Michel and Dr. Fournier, has also been made. The following formula is given: Bichloride of mercury, 1 part; chloride of sodium, 2 parts; dry peptone, 1 part; distilled water, q s. Triturate the solids together, moisten them with the least possible quantity of distilled water, and dry *in vacuo*. After drying, the residue is rubbed to powder. It is completely soluble in water.

To prepare a hypodermic injection containing one per cent. of bichloride of mercury, the following proportion is required: Mercuric peptone, 4 parts; distilled water, 96 parts.

The solution is entirely non-irritating, and the physicians above named have never observed any evil result from it.—New Rem., March, 1882, p. 77; from Rép. de Phar., 1881, p. 213.

Peptones—Administration in form of Enemata.—Mr. Henninger gives the following formula for enemata of peptones: Five hundred grams of very lean meat, minced fine, are placed in a glass vessel, on which are poured three liters of water, and 30 cubic centimeters of hydrochloric acid, specific gravity 1.15; to this mixture is added 2½ grams of the pure pepsin of commerce, at the maximum of activity, that is to say, digesting about two hundred times its weight of moist fibrin. It is left to digest during twenty-four hours at a temperature of 45° C. (= 113° F.), either in a water-bath or a stove; it is then decanted into a porcelain capsule, brought to the boiling-point, and, whilst the liquid boils, it is treated with solution of carbonate of sodium (1:4) to slight alkalinity, about 165 to 170 c.c. being required. The boiling liquid is passed through a cloth, expressed, and reduced on a water-bath to 1500 or 1800 c.c. Half of it is administered in three enemata, every day, adding 200 grams of white sugar for the twenty-four hours. The insoluble residue resulting in the above process, amounts to about one-third of the meat used.—Phar. Jour. Trans., November 12, 1881, p. 399; from "Paris Médical," No. 29, in Brit. Med. Jour., September, 1881.

Peptones—Estimation.—Mr. T. Defresne, after reviewing the value of the different processes in use for the estimation of peptones, remarks that the precipitation by alcohol and the determination of the nitrogen become satisfactory processes for the estimation of a solution of peptone if it be submitted to a preliminary analysis. The following is the plan proposed:

The peptone is saturated hot with sulphate of magnesium; if it contains gelatin this rises in an elastic viscous mass, and can be collected; in this case neither the density nor alcohol can be employed, and it is necessary to have recourse to the determination of the nitrogen. The weight of the nitrogen due to the gelatin, subtracted from the weight of the total nitrogen, gives a number which, multiplied by the constant 6.05. expresses the weight of dry and pure peptone.

The peptone, which does not contain gelatin, is diluted with twice its volume of water, and to 4 c.c. of this solution are added 2 c c. of a 3 per cent. solution of iodine. If the color becomes red-brown the peptone contains glucose; in this case alcohol would give erroneous results, and it is necessary to have recourse to the determination of the nitrogen, the results being multiplied by 6.05 as above.

If the solution of peptone does not show gelatin or glucose, alcohol may be employed with some advantage in respect to celerity, provided that the following conditions be exactly followed: Take 10 grams of pepsin, pour into it with agitation 100 grams of absolute alcohol, and then add 50 grams of ether. Allow it to deposit for three hours, decant carefully, and dry the precipitate at 100° C. on tared paper. Calculate out the weight found to 100 grams of the solution and add 5, and this will represent the quantity of dry and pure peptone contained in a given weight of the solution.

The peptone may further contain alcohol and glycerin, but these cannot become a source of error in the precipitation by ether-alcohol. —Pharm. Jour. Trans., July 2d, 1881, pp. 8–9; from Rép. de Pharm., ix., p. 262.

Ammoniacal Peptonate of Iron—Preparation.—Jaillet and Quillart state that a solution of ammoniacal peptonate of iron, capable of being injected under the skin without causing inconvenience, may be obtained by the following method: Solutions of 5 grams of dry peptones in 50 grams of distilled water, and of 5 grams of chloride of ammonium in 50 grams of water are prepared separately; 12 grams of officinal (“Codex?” Rep.) solution of perchloride of iron, *chemically neutral*, are poured into the solution of peptone; a coagulum is formed which is dissolved by adding the solution of chloride of ammonium. Finally, 75 grams of glycerin and sufficient distilled water to make 200 c.c. of mixture are added, and the product is made slightly alkaline by the addition of several drops of ammonia. After filtration a perfectly dialyzable peptonate of iron is obtained, which represents .005 gram metallic iron to each c.c. Ferrocyanide of potassium does not give a reaction until the preparation is acidified with a few drops of hydrochloric acid.—Pharm. Jour. Trans., December 31st, 1881, p. 544; from Répertoire de Pharm., December, 1881.

Mercuric Peptonate—Preparation and Preservation.—Mr. Otto Kaspar has experimented with a view to obtaining a solution of mercuric peptonate containing a constant percentage of mercury, and possessing a certain degree of stability. Of the different formulas, the following was employed: Take of mercuric chloride 1.0; dissolve it in 30.0 distilled water, and add, drop by drop, liquid peptone to complete precipitation. Collect the precipitate after ten to fifteen minutes, and dissolve it in a solution of 3.0 chloride of sodium in 50.0 of distilled water, and bring the whole to the measure of 100 c.c. This solution is supposed to contain 1 per cent. of mercuric chloride, but experiments have proved that, owing to the solubility of the mercuric peptonate, the resulting preparation contains a much smaller percentage. By increasing the quantity of peptone, preparations containing a larger percentage of mercuric chloride were obtained, but at best the product only contained 0.4495 per cent. A preparation containing practically 1 per cent. of mercuric chloride (in the experiment 0.985 per cent.) is obtained if 2.22 $HgCl_2$, dissolved in 50 c.c., is treated with 6.60 of peptone dissolved in 15 c.c. of water, and the precipitate is then further treated as above. Experiments regarding the stability of the solution have shown that exposure to the light is the main cause of change. When protected from light it has been kept unchanged for three months, but the preparation is best made freshly as often as possible. Small quantities of alcohol have a tendency to promote the decomposition, and larger proportions occasion precipitation. The preparation is not precipitated at a boiling temperature, but all experiments made to obtain an unchanged dry product by evaporation failed, reduction taking place during that process even at moderate temperature.—Schweiz. Wochenschr. f. Pharm., No. 39, 1881, pp. 386–390.

Pancreatins—Quality of the Commercial Article.—Mr. D. C. Moriarta has subjected samples of commercial pancreatin to examination, both in reference to its peptonizing action upon milk and its saccharifying properties. The methods and results of his experiments will be conveniently studied in New Rem., May, 1882, pp. 133–134.

REPORTS OF COMMITTEES.

REPORT OF THE COMMITTEE ON THE DRUG MARKET,

FOR THE FISCAL YEAR ENDING JUNE 30TH, 1882.

BY LOUIS LEHN, OF NEW YORK, CHAIRMAN.

In reviewing the state of the drug market during the past year, and noting its general tone as bearing both upon retail and wholesale dealer, we are gratified to report a sound and prosperous condition, and results that are in keeping with commercial progress in other channels. The feeling in the trade has been buoyant and confident; prices have, as a rule, shown an upward tendency, and holders of large stocks have not been, as in 1877 and 1878, disheartened and discouraged by the continual decline of values; on the contrary, a stock of drugs would, to-day, realize to better advantage than a year ago. From all available data, the volume of trade for the year is by far the largest we have ever had. Failures have been very few, and those that have occurred were of no importance. Altogether, we may well be satisfied.

During the past ten or twelve years the drug trade has taken many wonderful strides in the right direction, and in no respect is this progress more noteworthy than in the vast improvement which has taken place in the quality of the drugs and chemicals sold now as compared with those handled prior to that time. No longer are the trash, the last year's crop, the remnants and bargains of Europe, exported to the United States. On the contrary, the first selection, the finest choice, is eagerly sought for by the buyers of American houses. In domestic drugs the same spirit prevails, and we believe nowhere in the world are druggists as willing to pay high prices if thereby they can secure really prime goods. This spirit has been born, and is being fostered, by the spread of knowledge among our pharmacists, by our colleges of pharmacy, and our pharmaceutical journals, and we trust it may continue to grow until not only adulterations and admixtures shall have disappeared from the market, but until only the best and purest grades of goods be considered worthy of a place in a pharmacy.

Another good sign is the gradual lessening of speculation. What there is left of this, in the drug business, particularly undesirable phase of commerce, is restricted to a very few articles. The rampant speculation that would seize on anything, from oil of lemon to asafœtida, from canary-seed to balsam copaiva, and, by means of a well-engineered "corner," drive up the price to five and six times its real value, is getting to be a thing of the past. Sad experience has taught the speculators—a species fast becoming extinct in our branch of trade—that it is extremely hazardous to meddle with legitimate commerce.

Proprietary or "patent" medicines still play so important a part in the druggist's business, and there seems to be so little likelihood of a change for the better in this respect, that we cannot very well help noting an important departure in the manner of selling these goods, which has been generally adopted during the year just elapsed, by the proprietors of the leading articles in this line, at the recommendation of the Western Wholesale Druggists' Association—the so-called "rebate" plan. Its features are, no doubt, familiar to all our members, and as long as it does not interfere with the profits of the retailer, we see no objection to its introduction, and would even advocate its extension.

Strenuous exertions were made by proprietors of patent medicines, manufacturers of perfumery, and other interested parties, for the abolition of the stamp-tax on these goods; a bill looking to this end passed the House of Representatives, but failed in the Senate. While our deplorable internal revenue laws, sad relics of the war, should be repealed or changed at the earliest opportunity, there is no reason why a few favored industries, on whom, in comparison to some others, the tax falls rather lightly, should be picked out for relief, while the rest still continue to bear their burdens. The drug trade, as a whole, would be benefited but slightly by the enactment of the law in question. Only the most unsophisticated will suppose that the patent medicine men would reduce either the wholesale or the retail prices of their goods as a consequence. If we are correctly informed, the only actual difference to the trade would be that foreign perfumery, toilet preparations, and proprietary medicines need no longer be stamped.

Our unsatisfactory tariff, which, we unhesitatingly state, in its present form, as far as the drug trade and kindred branches are concerned, brings less revenue to the Government and more trouble and annoyance to the importer than any other that could be devised, is, with one exception, precisely as it was a year ago. This exception is the repeal of the law placing a discriminating duty of ten per cent. on articles produced east of the Cape of Good Hope but shipped from ports west thereof, and which was enacted in the interest of American shipping. But the channels of trade will not be regulated by acts of Congress, and the law failed of its purpose; at the same time, it was an additional hardship to Eastern importers, and not much pressure was required to secure its repeal. However, a commission created by Congress is now looking into the abuses of the tariff, and has held a number of sessions and listened to arguments made by the representatives of almost every branch of industry in the country. Being composed to some extent of experts, its recommendations will undoubtedly have great weight in the deliberations of our legislators, and we sincerely hope will lead to our receiving the first instalment of that great boon, revenue reform.

With the exception of the complications in Egypt, peace has prevailed all over the globe; the Egyptian troubles, on account of the general belief that they will be confined to their place of origin, have had but little effect in commercial circles; only a few articles in our line have experienced any considerable advance on account thereof.

In this country the prospects for the coming year look very bright, indeed; the crops are to be the largest ever harvested, and, from all appearances, the farmer will realize a good price for his produce. Immigration has been unprecedented, and has added materially to the wealth of the country. Finances are on a sound basis, and, unless some untoward accident intervenes, the ensuing twelvemonth will prove an era of unexampled prosperity.

We will now proceed to briefly review a few of the leading articles, their course in the market, their ups and downs:

Acid boracic has come into extended use as an antiseptic, and the chemically pure acid, both in crystallized and powdered form, is now sold at very low figures; the ordinary has also declined.

Acid citric has remained at its low price of last year, and, excepting a temporary flurry in July, when manufacturers were unable to meet the demand and outside holders asked as much as 67 cents, the fluctuations were inconsiderable. Manufacturers' prices ranged from 59 to 62 cents.

Acid oxalic has experienced a considerable advance. The exceedingly low prices ruling at the beginning of the year left little or no profit to the manufacturers, and the English makers, who supply this market, are said to have combined to put the price of their product up. To-day's quotations are about 50 per cent. higher than those of a year ago; taking into consideration the cost of manufacture, they are too high, and somewhat lower prices may be looked for.

Acid salicylic seems to be employed more than ever in the arts and for technical purposes; the supply is fully equal to the demand, and prices are somewhat lower. The quality of the acid of commerce has improved, and more of the recrystallized is used than formerly.

Acid tartaric has not changed much, though whatever change there has been was in an upward direction.

Alcohol was lower at the beginning of the year than it has been at any time since. The New York quotations in July were about $2.08; early in August it could still be bought at $2.09, but then rapidly advanced until, in the latter part of the month, $2.20 became the market price. In the beginning of September it declined, varying from $2.18 to $2.15, and continued at these figures till the middle of November, when it was offered at $2.13½. Towards the latter part of the month it began to advance, and this upward tendency continued until the price reached $2.25, about the middle of February. At about this price it remained for a month, and then began to decline—slowly, to be sure, and with occasional upward starts; but still the course was generally downward, until it was freely offered, towards the latter part of June, at $2.15, which, at this writing, is still the market price. The future price of alcohol will, of course, depend upon the result of the corn crop and the action of the distillers, and, from the present look of things, it will continue high in price during the coming year. Corn appears to be the one cereal the crop of which will fall below the average, and no lower prices need be looked for on this account; in fact, if we are correctly informed, the distiller is actually, at the present price of corn, losing money when he sells alcohol at New York for $2 15. And, as regards the action of the distillers, they have, during the greater part of the past year, acted in concert with great benefit to themselves, and it is but reasonable to suppose that they will repeat the experiment this year.

Ammonium carbonate has remained very steady, and prices have not varied more than ½ cent per pound.

Arnica flowers, though a little higher in price, are still very cheap; the crop of 1881 was very large, and the new crop, from present indications, will also be a fine one, so that no material advance is probable.

Balsam copaiva has had its usual share of fluctuations, though not to as great an extent as in some former years, the total advance being about 10 per cent.

Balsam Peru, which at the beginning of the year ruled at the high figure of from $3.50 to $3.75, and was then expected to surely decline, nevertheless continued to advance, until in January as much as $5 00 was paid. Since then it has gradually declined, and the price now is about the same as a year ago.

Balsam tolu continues at its low price; it is now quoted at 44 cents, a decline in the twelvemonth of about 5 cents.

Borax advanced steadily from 13 cents to 15½ cents, which latter figure it reached in May; since then it has declined to 14¼ cents. California and Nevada continue to supply large quantities of unrefined, nevertheless importations of boracic acid have not ceased, as was expected when the enormous deposits on the Pacific coast first became known.

Camphor has not fluctuated much; the price has ranged from 25 to 23½ cents, the latter figure being the one now quoted. Some of the American refiners are said to have been badly bitten by receiving crude camphor, strongly adulterated with common salt. The adulteration of crude camphor seems to be a favorite pursuit of the Chinese and Japanese, and much ingenuity is exercised by them to deceive the buyer of this article.

Canary seed rules somewhat higher than it did a year ago; the advance was slow but steady, and the market is rather firm. The demand for the finer grades, the Sicily and Spanish seeds, is on the increase, while Smyrna seed is not as much sought for.

Cardamoms, both Malabar and Aleppy, have been in good demand; prices were steady and are well maintained.

Castor fiber is still very scarce; only small parcels come to market, and correspondingly high prices are asked.

Chamomiles, German, were always to be had of good quality and at reasonable prices; the new crop seems to have been a very good one both as regards quality and quantity. *Roman*, however, while plentiful enough, were not very handsome.

Cinchona barks have attracted a great deal of attention, and not without cause. The Cuprea bark, from which so much was expected, and the large receipts of which two years ago served to considerably depress the price of quinine, has, as many predicted, run its course, and hereafter supplies from that quarter will be small. The extent of the forests was much overrated, and last year's production in this district, 90,000 cerons, will never again be reached. Flat calisaya bark is becoming scarcer each year, and those of our druggists who will use no other must make up their mind to pay pretty steep figures; the same is true of flat red bark, though both calisaya and red bark, in quills, from Java, Ceylon, and East India, fully as rich in alkaloids as the flat barks, may be purchased 20 and 25 per cent. lower. The demand for the cheap Colombian barks is on the decrease; we are beginning to discover that cinchona barks cannot well be judged by appearance, and that a rich bark cannot be obtained at a low price. As a whole the quality of the cinchona barks now handled will compare very favorably with that sold some years ago.

Cinchonidia sulphate, which on July 1st, 1881, was quoted at 75 cents, on October 1st declined to 65 cents, again advanced to 75 cents at the beginning of December, and to 90 cents in the middle of the same month. At this price it remained until April 10th, 1882, when the manufacturers put the price up to $1.00 per ounce, and have held it at this figure since. The low price of last fall was owing to large importations of German cinchonidia; the subsequent higher prices are said to have resulted from the fact that a leading American firm contracted with the principal European makers for their total product, and now control the supply.

Cloves, Zanzibar, have declined; in spite of early reports of disastrous storms, the crop was excellent, and higher prices are not to be expected; a yet further decline is not probable, and the low prices ruling prior to 1873 are out of the question as long as the high export tax levied since then by the Sultan of Zanzibar is in force. *Amboyna* are also somewhat lower, in sympathy with Zanzibar.

Coca leaves continue in good demand, while the supply of prime leaves is very limited; accordingly the market has ruled firm for handsome goods.

Cream of tartar has not fluctuated to any extent; prices varied from 30 to 33 cents for crystal; lower figures are not likely to prevail as long as the present duty on imported cream of tartar remains.

Cubebs have again experienced material changes, and while the price to-day does not differ much from that of a year ago, in the interim quotations have been as much as 20 per cent. higher and 10 per cent. lower. The high prices realized by the planters during the past few years have led to the extension of the territory devoted to their production in Java and Penang, and larger supplies may be looked for, whereas the demand is on the decrease. Yet this is a favorite article of speculation, and in spite of all indications prices may advance.

Ergot was *the* article this year on which the speculators burnt their fingers. In July last the price was from 55 to 65 cents, the latter for Spanish. Reports were freely circulated that the Spanish crop was a total failure, the supplies from Southern Russia would be very small, and that ergot would sell for $1.00 by September. Instead of this the contrary proved to be true, and prices rapidly declined until to-day 23 cents per pound is a fair price for fair goods.

Glycerin advanced still further, until in December 39 and 40 cents became the price of the American manufacturers; this high figure brought on large importations of German and Russian, which served to depress the price to 34 cents, at which it has ruled steady since April. The requirements of manufacturers of dynamite, as well as its extended use in the arts, cause a continuous demand for this article, while the unsalability of the by-products, stearin and olein, also tend to keep up the price.

Guarana ruled steady in the early part of the year, but of late supplies have been very limited, until stocks here have become exhausted, and it now appears to be concentrated in the hands of one holder. The price has gradually advanced from 75 to 95 cents, at which latter it is now held.

Gum Arabic.—In the early part of the year gum arabic of all descriptions was so dull and prices were so low that still lower quotations seemed impossible. Yet prices continued to come down, until in April and May the lowest point in years was reached. Then came the Egyptian troubles and gum arabic at once began to advance until now comparatively fair prices are paid. Still, even the present prices are very low.

Gum asafœtida continues quiet and uninteresting; low prices still prevail and no change is anticipated.

Gum tragacanth has remained stationary in value. The demand for Turkish, especially for the finer grades, is steady, and higher prices may rule.

Hemp seed is higher; Russian has advanced from $1.25 in July, 1881, to $1.50 in July, 1882.

Iodine and all its salts have continuously declined. The supplies from Bolivia are said to be almost unlimited, and English, Scotch, and French manufacturers of the article, as well as the manufacturing chemists, lost heavily. The Bolivian product is found in combination with nitrate of soda, and can be easily separated; the first cost is next to nothing, and eventually the manufacture of iodine from seaweed must cease if the South American supplies hold out. The decline was gradual, but tremendous in all, being from $3.50 to $2.45.

Matico Leaves were in good demand, and supplies of a prime article being very limited, the market remained firm.

Mercury has not varied much in value, 39 cents being the lowest and 42 cents the highest quotation in the past twelve months. The supply fully meets the demand, and no change is probable.

Morphia and its salts have naturally followed the course of Opium, though not as closely as one would expect; the price to-day is precisely the same as it was to-day a year ago. It has fluctuated as follows:

1881.		1882.	
June 22,	$3.75	February 17,	$3.80
July 12,	3.60	May 1,	3.65
August, 22,	3.50	June 7,	3.50
September 12,	3.65	August 3,	3.60

Foreign morphia is imported but little; the high duty of $1.00 per ounce is almost prohibitory, yet in spite of it, enterprising houses have imported some, and successfully competed with the American manufacturers.

Oils.—Essential oils on the whole have not experienced many changes; naturally the price of the raw material influenced the price of the oil. Formerly some essential oils were favorite articles of speculators, but of late speculation in this class of goods has totally stopped.

Oil of anise is much lower; $2.10 to $2.12½ was asked a year ago, from which price it declined to $1.55; thence it advanced until $1.70 became the ruling quotation, at which price it remains.

Oil of Bergamot continues at unremunerative prices; there has been no change of any account, and none is likely to occur in the near future.

Oil of Cassia advanced from 85 cents, until in December as much as $1.02½ was asked, but now the price is again at about the old figure.

Oil of Lemon has pursued an upward course during the whole year; it started at about $2.90 and steadily advanced until now $3.75 is asked for the best brands. Last year's crop was poor, and lower prices are not anticipated until the product of the new crop is placed upon the market.

Oil of Peppermint.—To judge from the reports of the growers, both in Central New York and Michigan, the last crop was the poorest ever gathered, and prices should have advanced. These unfavorable reports have for some years past appeared with unfailing regularity, and buyers no longer place much credence in them, as the market has failed to bear out their prognostications. A slight advance, however, did take place; but it was not of long duration, and to-day's prices are but a shade higher than those of a year ago.

Oil of Rose has experienced quite an advance, and popular brands are to-day quoted at $8.60 to $8.75, while the same brands could have been bought last fall at from $6.10 to $6.25 per ounce. Lower prices are not expected, as almost the whole product of the new crop is concentrated in a few hands, and hardly any pure oil is to be procured in Turkey outside of the few large holders.

Oil of Sassafras, which at the beginning of the year was quoted as low as 38 cents, suddenly began to advance in the fall, and continued its upward course until in December 65 cents was paid in some instances. From this point it began to decline, and now 41 to 43 cents is the ruling quotation.

Oil of Wintergreen.—The course of this article was very similar to that of the other domestic oils; it began to increase in value until $3.20 was asked in the beginning of fall, whence it assumed a downward tendency, until now the price is but little above that ruling at the same period last year.

Castor Oil has fluctuated considerably within rather narrow limits. In July, 1881, it was quoted about 10½ cents, in cans, from which figure it advanced until 13½ cents became the market price in November; then it again declined to 12¼ cents, and now 13 cents is an average price for good brands, in cans. The importation of castor oil has almost altogether stopped, because of the high duty; besides the best American oil is superior to the East Indian and Italian, and would be preferred in any case by careful buyers.

Cod-liver Oil.—But few articles in our line have become enhanced as much in value during the past year as cod-liver oil. The catch of codfish in Norway, where most of the medicinal cod-liver oil comes from, was very small in 1881, being about one-third less than in the preceding year, and the prices demanded by importers, though but little above actual cost, were very unwillingly paid at the beginning of the year, buyers still being accustomed to the very low prices which had ruled for some years previous. In February reports from Bergen showed that the prospective catch would be still smaller than it had been in 1881, though but few expected such meagre results as eventually turned up. Severe storms prevented the fishermen from reaching the fishing-grounds at the usual time, and even after they had arrived there, about six weeks behind time, the unfavorable weather continued. Besides this, the fish proved to be unusually lean, and the livers small. The exports of cod-liver oil from Bergen in 1880 were 76,400 barrels, in 1881 they dropped to 52,060 barrels, and this year will probably not exceed 30,000 barrels, of which about 20 per cent. is medicinal oil. This shows that lower prices are out of the question, and though most purchasers yet shrink from paying the price now demanded by the importers, $72.00 per barrel of 30 gallons, they must sooner or later yield to these terms. Newfoundland oil of course advanced in about the same ratio, but somewhat later; good brands could be bought at 72 cents early in the spring; in June the price was about 80 cents, but now it is firmly held at $1.25 per gallon.

Opium.—The reports at the beginning of the last fiscal year indicated a larger crop than had been gathered for years, and prices dropped rapidly and continually until in August the market quotations were lower than they had been since the war. This state of affairs continued until January, when prices began to advance; since then the market has ruled firm, and the present quotations are about 12½ per cent. higher than they were in the last months of 1881. Importations were rather light; the statistics of the total quantity imported are not yet obtainable, but to judge from those at the port of New York, where most of the opium is entered, were but little more than last year. The exact figure is 158.127 pounds. Regarding the new crop, but little is known; the usual rumors of frost, drought, etc., are again in circulation, but it is a difficult matter to tell how far to give them credence.

Potassium Bromide has been slightly advanced in price, being now quoted at 32 cents against 28 cents at the beginning of the year. There is no special reason for this advance, as the supplies of bromine from West Virginia continue undiminished.

Potassium Iodide declined from $2.25 to $1.45 within the year; the causes of the decline are mentioned under the head of "Iodine."

Quinine.—The variations in the price of this article, while considerable by themselves, are slight in comparisom to the fluctuations of former years, and at the date of this writing, the price of the American manufacturers is almost the same as it was at the end of the last fiscal year, being now $2.20, while at that time it was $2.25 per ounce. In the interim, the prices of American quinine have ranged as follows:

1881.		1882.	
June 22,	$2.25	February 1,	$2.40
August 22,	2.10	" 13,	2.30
September 12,	2.00	April 10,	2.20
October 1,	1.90	" 22,	2.10
December 14,	2.10	May 13,	2.20
" 19,	2.30	" 29,	2.10
" 22,	2.50	June 7,	2.00
		August 1,	2.20

It will be noticed that the highest and the lowest quotations ruled within a comparatively short period of each other, and in fact it is impossible to explain the why and wherefore of a rise or decline in the price of quinine. The momentary supply, the result of a bark sale in

London, very often the opinions or whims of the manufacturers, will serve to depress or advance the price.

Foreign quinine has been consumed to a greater extent than ever before, and the demand seems likely to keep on increasing. Of course this is owing altogether to its lower price, it being generally offered at from 10 to 20 cents below the price of American. An accurate idea of the increase may be formed by a comparison of the importations; these were for the fiscal year—

1878–1879,	228,000 ounces.
1879–1880,	416,998 "
1880–1881,	408,851 "
1881–1882,	592,445 "

at the port of New York alone, while during the year 1875–1876 the total imports were only 23,000 ounces.

It is impossible to foretell the course of quinine for any length of time; aside from the fact that it has become the article which speculators have made peculiarly their own, there is great uncertainty regarding the supply of bark. At present, the bark trade of the world is almost entirely controlled by one individual, but the area in which cinchona barks are being cultivated is being so rapidly extended that this state of affairs will probably soon cease. The new South American bark-fields have not come up to the sanguine expectations held regarding them, but now that the 10 per cent. duty on East Indian barks has been removed, the barks from that quarter will make up any deficiency in the South American supplies. Other disturbing factors are the uncertainty in regard to the tariff, and the undesirable contingency of a combination of all the leading quinine manufacturers of the world.

Rape Seed has not changed much; the supply has always been up to the demand. The small German seed seems, as a food for birds, to be preferred to the large, black English seed, and the demand for the latter is decreasing.

Rose Leaves are still very high in price, and lower figures are not likely to prevail; the new crop, from all reports, was even smaller than last year's.

Senna Leaves.—Alexandria senna, in the early part of the year, did not attract much attention; prices were low, and supplies plentiful. To-day the price has almost doubled, and even at present figures holders do not seem very anxious to sell. The cause of this change is the Egyptian war, and on the result of that struggle the future price of Alexandria senna will depend. Tinnevelly senna has advanced in sympathy, though, of course, in a much smaller ratio.

Shellac.—The course of this article, which in former years was noted for its huge and violent fluctuations, was quiet and uneventful; prices have remained about the same.

Tonka Beans are much lower; the new crop is excellent, both in quality and quantity, and Angostura can now be bought at $1.30, against $2.75 last July.

Vanilla Beans continue in good supply, both Mexican and Bourbon; they have, to some extent, recovered from the depression which existed a year ago, and prices are rather higher, though still very reasonable.

Of those remedies which have been introduced to our markets within a few years, and which may be called

NEW REMEDIES,

we will mention:

Acid Gynocardic, from chaulmoogra oil, and used like this in skin diseases, rheumatism, etc. It is looked upon as the active principle of the gynocardia seed, and is said to have been employed with success in the treatment of the above diseases. It is used both internally, in the shape of pills, and externally, in the form of ointment.

Carica Papaya Leaves have now been received; the demand is small, the dried juice and the papayotin being used in preference.

Chinoline.—The employment of the salts of chinoline, as a substitute for quinine, is increasing in extent, and besides the tartrate. the salicylate, sulphate, muriate, and tannate, are now manufactured. This is not the place to enter upon an extended dissertation regarding its efficacy; it is still an open question whether it will effect all that is claimed for it.

Cola Nuts are a new drug from Central Africa; they are said to be an aid to digestion, and to enable one to bear fatigue and hunger, similar to coca leaves; they contain an essential oil, which has not yet been isolated, and about 2 per cent. of caffeine; to these two ingredients their good effect is no doubt due.

Coto Bark is somewhat lower in price; the demand is on the increase, and this has naturally brought on larger supplies.

Diphenylamine, a coal-tar product, has of late come into use as a test, chiefly to detect the presence of nitric acid.

Duboisia Leaves have lately come into the market; they are used but little, the alkaloid receiving the preference.

Duboisina Sulphate is increasing in demand; prices are a little lower.

Erythrophleine, the active principle of sassy bark, has received some attention; the muriate is the salt usually prescribed. Its high price has tended to retard its general introduction.

Eserine and its salts, because of the increased demand, and its production on a larger scale, slightly cheaper.

Euphorbia Pilulifera, an herb found both in East India and Australia, is a new remedy, said to be a cure for asthma and other affections of the chest. It is used as a decoction.

Gynocardia Seed, from which the chaulmoogra oil is expressed, is now to be obtained here.

Homatropine has come into general use; its great importance as a remedial agent is firmly established, and the demand is continually increasing.

Hyoscyamine has advanced about 50 per cent., owing to the higher price of the raw material; this has not in the least affected the demand, which has more than doubled during the year.

Hyoscine is also coming into extended use; the iodide, bromide, and chloride are the salts now used.

Naphthalin has of late been recommended as an antiseptic dressing; a white, finely crystallized product is used for this purpose.

Naphtol (*Beta-Naphtol*), a preparation gained from the products of the dry distillation of wood, etc., has been introduced by Professor Kaposi, of Vienna, as a substitute for tar, in the treatment of skin diseases. It has been successfully employed in cases of eczema, scabies, etc. As first placed upon the market, it was in light brown crystalline pieces, of a penetrating odor; now a white refined, and a resublimed preparation, the latter of a brilliant white color and much weaker smell, are manufactured.

Nitroglycerin, in solution, originally a homœopathic remedy, has lately been prescribed by regular practitioners, as a cure for headache.

Papayotin is gradually coming into demand; it is to be regretted that inferior preparations, of very little strength, are palmed off for the real papayotin. A pure article should peptonize 200 parts of fresh beef which has been deprived of superfluous moisture by means of pressure with filtering-paper.

Pelletierine Tannate continues to be used as a substitute for, and in preference to, the pomegranate bark of the root; prices are lower, on account of increased demand, and consequent larger production.

Pilocarpine is now generally recognized as one of the most important of the modern remedies; the demand is continually on the increase, chiefly for the muriate and nitrate, which have been found to be the most stable and reliable of its salts. The price has declined almost 50 per cent, the supply of jaborandi leaves being abundant, and the cost of manufacture naturally decreasing as larger quantities are made.

Quebracho Bark is another of those new remedies whose therapeutic worth is pretty generally appreciated. The demand was large, but with ample supplies, prices declined, until now it can be bought for about one-third less than a year ago. The quebracho blanco is the only variety now recognized as genuine.

Quinine Iodate is a new salt, for which a demand has lately sprung up; it is claimed to be more efficacious than the iodide.

Resorcin.—The value of this article as an antiseptic is now definitely established. It acts as a poison on fungous growths, and, like carbolic acid, may be used as spray, as a dressing for wounds, or in combination with vaseline as ointment. It is preferred to carbolic acid because less poisonous and more soluble in water (80 : 100). Three kinds are in the market: the ordinary, of a brownish color; the white, a crystalline powder; and the resublimed, in shining needle-like crystals. Only the last two should be administered internally.

REPORT OF THE COMMITTEE ON LEGISLATION.

The committee respectfully report that during the past year bills affecting the practice of pharmacy have been under consideration by the legislatures of various States. New laws, regulating this practice, were enacted and approved in Georgia and Wisconsin, and amendments to previously enacted pharmacy laws received the sanction of the proper authorities in Connecticut, Iowa, and West Virginia. Laws intended to prevent the adulteration of food and drugs were enacted in Louisiana and Massachusetts, and the new license law of Connecticut contains a clause referring to the selling of liquors for medicinal purposes. These comprise all the new laws and parts of laws affecting pharmacists, passed since our last meeting. However, in answer to circulars sent out, the committee has come in possession of several older laws and parts of laws, which have not been previously published in our Proceedings, and which are appended to the present report.

Alabama.—The Code of Alabama, 1876, requires all poisons to be labelled as such, and forbids the delivery of poisons to apprentices or children under ten years, except upon a written order of their masters or legal guardians; the term, "poison," is not defined.

Another section requires all "druggists" to obtain license from some medical board in the State.

Mr. Candidus writes that these enactments seem to be a dead letter on the statute-book, except in a few counties.

Colorado.—Mr. H. R. Hartung has sent us a copy of the poison law, passed nearly eleven years ago by the legislature of Colorado Territory. It is similar to the poison laws or poison clauses in the pharmacy laws of several of the older States, and directs the proper labelling of poisons enumerated in two schedules, and the registration of the poisons of one of these schedules, comprising arsenic, prussic acid, poisonous alkaloids, and aconite, with their preparations or salts, and tartar emetic. The poison-book is to be preserved for one year.

Connecticut.—The pharmacy law of 1881 applied only to cities and boroughs; the amendments of the present year repeal this clause and extend the provisions of the law to the entire State, stipulating also that pharmacists affected by this extension must register within ninety days. From March 31st next, all applicants for a license have to submit to an examination, except graduates of reputable colleges of pharmacy and those having a license granted within one year by another pharmacy board, if such license shall be deemed sufficient evidence of qualification by the commissioners of Connecticut. The license fee remains at $3, and the fee for examination and license is fixed at $5, which sum is to be refunded after the first failure of the applicant to pass the examination, but not after the second failure.

A section has also been added, enumerating twenty-seven drugs and chemicals, which are to be properly labelled. As a rule such schedules are unsatisfactory in either mentioning too many or too few of the poisons; in this instance we find that ammoniated mercury and red oxide of mercury fall under the provisions of the law, while corrosive sublimate is not embraced, although sold perhaps more frequently than the two mercurials named combined. No change has been made in the poisons required to be registered; they remain three in number, viz., arsenic, strychnia, and prussic acid.

The liquor law of Conneticut exempts licensed druggists from its provisions, but requires them to pay $12, or in towns of less than 5000 inhabitants $10 for the privilege of selling spirituous and intoxicating liquors, only upon the prescription of any practicing physician. In the annexed copy of the section of this law, the clause referring to druggists has been italicized.

Georgia.—The Board of Pharmaceutic Examiners created by the pharmacy law, consists of five druggists or pharmacists, who are appointed by the governor for three years. The board grants licenses, and is entitled to one-half of the fines collected under this act, and to a fee of $15 "for examination and license," which sum is not returned to a candidate failing to pass, but stands to his credit for another examination, after a period of six months. The law recognizes as entitled to a license: physicians; druggists of ten years' experience; druggists of nine years' experience, having attended at least one course of lectures in a college of pharmacy; pharmacists possessing a diploma from a foreign college or institution or examining board, and pharmacists with at least three years' experience, and possessing a diploma of a college of pharmacy, acknowledged by the American Pharmaceutical Association. The meaning of this last clause is not clear, since this Association has never "acknowledged," that is to say, received delegates from colleges of pharmacy, because they were educational institutions, "but solely because they were associations of pharmacists and druggists." The licentiates of the Georgia Board are required to register with the ordinary of the county, for which a fee of fifty cents is paid. The board consists of Edward Barry, of Augusta, chairman; J. S. Pemberton, of Atlanta, John Ingalls, of Macon, Osceola Butler, of Savannah, and Isadore Zacharias, of Columbus, secretary.

It will be observed that the fee is larger than that allowed by any other pharmacy law. In three or four States the fee is $10, in all others it does not exceed $5 for examination and registration, and in most cases it is less than the sums named for registration where no examination is required. Section 6 of the Georgia law is differently interpreted; the Board claims the full fee for each license, whether granted after, or without an examination; on the other hand, we have been informed by Mr. Theo. Schumann, that the principal movers for the passage of the law, the Georgia Pharmaceutical Association, did not intend this law to levy a new tax upon the druggists, and that a case is pending in the courts of the State to test this fee question.

Indiana.—Mr. George W. Sloan has communicated to us two sections from the laws of Indiana on "Public Offences," one of which prohibits the sale and advertising of abortifacient medicines, while the other permits the sale, by druggists, of spirituous liquors on Sundays, holidays, and election days, only upon physicians' prescriptions.

Iowa.—At the last session the legislature amended the pharmacy act of 1880 in the following particulars: The clause of section 4, permitting the registration of those in business within sixty days, is replaced by the provision that those registered in this manner, forfeit registration on voluntarily giving up the business for two years, and may subsequently be registered only by examination. An annual renewal of registration is provided for at a cost of $1; changes in the locality of business are to be registered at a cost of 50 cents, and the display of the certificate of registration is made compulsory.

The license required annually of itinerant vendors of nostrums, etc., according to section 10, is issued by the Commission of Pharmacy, and all moneys in excess of $1000 per year, accruing from this source, and from fines for the violation of this section, are to be paid into the State treasury.

The fine of not less than $50 for violations of the pharmacy law, provided by section 11, has been defined to be not more than $200.

The original and the amended pharmacy law contain a provision (sec. 8) permitting the sale by registered pharmacists, of spirituous liquors for the legitimate and actual necessities of medicine, and providing for violations of this clause the fines of the Iowa liquor law, and in addition thereto, the erasure of the offending druggist's name from the register. Under this provision, which we have italicized in the annexed copy of the law, several convictions had taken place, and were sustained by the courts. But the legislature in June last, determined to make this section more stringent, and amend it in such a manner as to require registered pharmacists to file a bond of $3000, apply for and procure a permit for the sale of liquors, make monthly reports of such purchases and sales, and in other respects comply with the Iowa prohibitory law. This legal enactment was not approved by the governor; but notwithstanding this became a law from and after July 4th last. Many pharmacists, in order to escape the vexations to which they would be subjected under this law, have publicly declared that they will not sell any spirituous liquors for any purpose whatever.

Kentucky.—From information received from Mr. Jefferson Oxley, we learn that in 1880 a poison law was passed in this State, of which a copy is appended. It enumerates an unusually large number of poisons, including proprietary medicines recommended as emmenagogues or parturients, of which all sales are to be registered, and the majority of which are permitted by other laws to be sold without registration, under the usual precautions. The pharmacy bill, which was before the last legislature, and was applicable to the entire State, failed to pass, as did also the bill granting a charter to the Kentucky Pharmaceutical Association.

Louisiana and Massachusetts.—The State Pharmaceutical Associations which have been recently formed in both States, have pharmacy laws under consideration, with the view of presenting them to the legislatures at their next sessions. In Louisiana the bill failed to pass the lower house, after having been passed through the Senate. The Massachusetts bill was reported from the committee with a negative recommendation.

The food and drug adulteration laws, enacted in both States, are framed after the draft of the National Board of Trade, which was adopted in New York and New Jersey, as reported by this committee last year. In fact the Massachusetts law follows very closely the language of the preceding two, while the Louisiana law differs mainly in the following respects: the words "drug" and "food" are not defined; adulterations of drugs are restricted to articles sold under a name recognized in the United States Pharmacopœia; adulterations of food apply only to mixtures and substitutions; all packages of drugs and food, sold at wholesale, or from which retail sales are made, require to be stamped in plain large letters, showing the true quality and kind of the articles sold. Analyses made at the request of citizens are likewise provided for.

Minnesota.—Mr. Karl Simmon has procured for this committee a certified copy of those sections of the statutes of 1878, referring to the adulteration of drugs and the sale of poisons. The latter require the recording of all sales of arsenic, strychnine, corrosive sublimate, and prussic acid, and the careful labelling of all active poisons.

Missouri.—A bill prohibiting the sale of ecbolic medicines was before the legislature last year. It contained several features which appeared to us to be impracticable. We have not learned whether or not it became a law.

New Jersey.—A prosecution instituted under the pharmacy law of this State resulted in the conviction of the offender, and on appeal, the verdict was sustained. The State Association amended its by-laws so as to make ineligible as members those pharmacists who have not complied with the pharmacy act.

Tennessee.—Mr. J. C. Wharton has furnished the committee with several sections of the statutes of Tennessee, one of which prohibits the adulteration of drugs and medicines, while the others refer to the sale of poison, one section requiring the registration of the sales of any poisonous liquid or substance. The law was made during slavery times, and of course the clause referring to slaves is obsolete. Several of the provisions as worded, though, perhaps, not as intended, are subject to criticism.

Texas.—The committee received from Mr. E. M. Wells a copy of the law prohibiting adulteration, as contained in the Revised Statutes of 1879.

West Virginia.—The amendments comprise the following provisions: Applicants for registration must present evidences of good moral character. The regulations for the sale of poisons have been simplified; stringent provisions have been adopted against abuses in the sale of spirituous liquors by druggists and pharmacists, involving after two convictions the erasure of the violator's name from the register; the certificate of registration is to be conspicuously displayed. The law applies only to incorporated cities and towns, with the exception of poisons and of spirituous liquors.

Since one commissioner is appointed for each Congressional district, and West Virginia is now entitled to four Representatives in Congress, there are now four members of the Commission of Pharmacy, namely, E. Bocking, of Wheeling, J. L. W. Baker, of Martinsburg, E. L. Boggs, of Charleston, and A. N. Williams, of Parkersburg

A liquor bill, known as House Bill, No. 274, was indefinitely postponed, after persistent opposition from the West Virginia Pharmaceutical Association. It provided for county boards, composed of three physicians, for the examination of pharmacists; for affidavits in the case of each sale of alcohol; for certificates by physicians, affirming that "any intoxicating liquor, drink, mixture, or preparation whatever," prescribed by them, was absolutely necessary as a medicine,—and for various other unreasonable and stupid measures. One of these was afterwards appended to section 9 of the amended pharmacy law, and provides that in prosecutions against a druggist, the sale of liquor is to be held as unlawful unless the contrary be shown.

Wisconsin.—The new pharmacy law establishes a State Board of Pharmacy, composed of five practicing pharmacists, appointed by the Governor, upon the recommendation of the Wisconsin Pharmaceutical Association; each year one member of the board retires. Those in business at the passage of the act, either on their own account or for at least five years with others, also graduates in pharmacy, are entitled to registration without examination; the fee being $2, and for examination and registration $5. Clerks, having had at least two years' experience at the passage of the law, may register as assistants, the fee being $1. Minor certificates may be granted for towns and villages of less than 500 inhabitants. Licentiates of other State Boards may be registered, if deemed proper. Annual renewals of the certificates of registered pharmacists are required, the fee not to exceed $2. The secretary receives a salary; the other members an allowance of $5 per day and legitimate expenses; surplus funds are to be held for carrying out the law, and accounted for, both to the Governor and to the Wisconsin Pharmaceutical Association. Penalties inure one-half to the Board, the other half to the School Fund. A provision against adulteration of drugs has been admitted, and a list of articles is given which, when sold, must be properly labelled, but do not require registration. A curious feature is found in section 16, which speaks of membership, and provides for the unconditional renewal—without examination or other penalty—of the certificate of registration of those who have neglected or refused these annual renewals for an unlimited period.

The first State Board consists of T. H. Spence, of La Crosse, President; A. H. Hollister, of Madison, F. Robeson, of Kenosha, A. Conrath, of Milwaukee, and E. B. Heimstreet, of Janesville, Secretary.

I. POISON LAW AND DRUGGISTS' LICENSE LAW OF ALABAMA.

§ 4242 (3683). *Selling poisons without precautions to prevent accidents.*

Any druggist, apothecary, or other person, who sells and delivers any poison or poisonous substance, not having the word poison written or printed on a label attached to the vial, box, or parcel in which the same is sold; or sells and delivers any tartar emetic, laudanum, or morphine, not having the common name thereof written or printed on a label attached to the vial, box, or parcel containing the same; or sells or delivers any poison or poisonous drugs or substance to any apprentice, or to any child under ten years of age, without the written order of the master of such an apprentice, or the parent, guardian, or person having the legal charge of such child, must on conviction be fined not less than fifty nor more than three hundred dollars.

§ 4213 (1234). *Druggists to obtain licenses; penalty for failure.*

All druggists in this State are required to obtain a license to deal in drugs from some Medical Board in this State, or from the Medical College of Alabama; and any person violating the provisions of this section, on proof thereof, is not entitled to recover for any drugs or medicines he has sold, and is also guilty of a misdeameanor, and on conviction must be fined not less than one hundred dollars.

From the Code of Alabama, 1876.

II. POISON LAW OF COLORADO.

An Act for Regulating the Sale of Poisons.

Section I.—*Be it enacted by the Council and House of Representatives of Colorado Territory.* From and after the first day of March, A.D., 1872, it shall be unlawful for any apothecary, druggist, or other person to retail any poison enumerated in Schedules A and B, appended to this act, without distinctly labelling the bottle, box, vessel, or paper, and wrapper or cover, in which said poison is contained, with the name and place of the seller.

Sec. II.—It shall be unlawful for any apothecary, druggist, or other person to sell or deliver any poisons included in Schedule A, without, before delivering to the buyer, making or causing to be made an entry in a book kept for that purpose only, stating the date of sale, the name and address of the purchaser, the name and quantity of the poison sold, the purpose for which it is stated by the purchaser to be required, and the name of the dispenser; said book to be always open for inspection by the proper authorities, and to be preserved for at least one year; provided, that the provisions of this section shall not apply to the dispensing of poisons, in not unusual doses or quantities, upon the prescriptions of legitimate practitioners of medicine; and provided, further, that nothing contained in the foregoing sections one and two shall apply to or interfere with the business or sale of medicines in the original packages of the manufacturer.

Sec. III.—Any apothecary, druggist, or other person, who shall violate sections one or two, shall be guilty of a misdemeanor, and shall upon conviction thereof be fined a sum not exceeding five hundred dollars, or imprisonment in the county jail not exceeding six months.

SEC. IV.—Any person who in making application to purchase and receive, or purchase or receive any of the poisonous substances or liquids mentioned in Schedules A and B appended to this act, shall give a false or fictitious name or address to the apothecary, druggist, or other person, shall be guilty of a misdemeanor, and shall upon conviction thereof be fined a sum not exceeding five hundred dollars, or imprisonment in the county jail not exceeding six months, or by both such fine and imprisonment, in the discretion of the judge.

SCHEDULE A.

Arsenic and its preparations, prussic acid, cyanides of potassium and all metallic cyanides, strychnia, and all poisonous vegetable alkaloids and their salts, aconite and its preparations, and tartar emetic.

SCHEDULE B.

Belladonna, coniine, cantharides, corrosive sublimate, henbane, nux vomica, savin oil, ergot, digitalis and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid, oxalic acid, opium, and all preparations of opium except paregoric, and other preparations of opium containing less than 2 grains to the ounce.

III. CONNECTICUT LAWS RELATING TO PHARMACISTS.

AMENDED PHARMACY LAW (See Proceedings, 1881, p. 379).

CHAPTER XXI.—AN ACT, *Amending an Act, Relating to Medicines and Poisons.*

SECTION 1. *Be it enacted by the Senate and House of Representatives in General Assembly convened:* Section three of chapter one hundred and twenty-two of the public acts passed January session, 1881, is amended to read as follows: The comptroller shall designate a room in the capitol for the meetings of said commissioners, which shall be held in each year on the first Tuesdays of March, April, June, September, and December, and at such other times and places as they may deem necessary, to determine the qualifications of applicants for license as pharmacists, and said commissioners shall license, by a certificate signed by them, or by a majority of them, such persons as shall produce satisfactory evidence to them of their qualifications and attainments, either by diploma granted to the applicant by some reputable college of pharmacy, or by the certificate of some reputable pharmacist that the applicant has, for not less than three years prior to his application, received instruction in pharmacy and possesses the necessary qualifications of a pharmacist, or by other satisfactory evidence. On and after March 31st, 1883, all applicants for a license, other than a renewal of a license previously granted by said commissioners, shall be personally examined by said commissioners; *Provided, however,* That such examinations may be omitted in the case of applicants who exhibit to said commissioners a diploma granted by some reputable college of pharmacy, or a license in force within one year prior to the date of such application, granted by the board or commissioners of pharmacy of another State, if such license shall be deemed sufficient evidence of qualifications by the commissioners of pharmacy of this State. Licenses shall specify the name of the person licensed, the date when granted, the city or town in which he shall conduct his business, and if in a city, the street and number of his place of business; and his license shall be conspicuously exhibited in his place of business, and shall remain in force until the first day of April next after said date, unless granted at a meeting of said commissioners on the first Tuesday of March, in which case such license shall terminate on the thirty-first day of March of the succeeding year, or unless such person shall remove his place of business without notice to the commissioners; and a license may be renewed upon the application of the person licensed, upon the terms hereinafter provided.

SEC. 2. Section five of said chapter is amended to read as follows: Each applicant shall pay to said commissioners three dollars for his license and two dollars for each renewal thereof; and whenever a personal examination shall be made as provided in the last preceding section, a fee of five dollars; but if upon such examination a license shall be refused, said fee shall be refunded to said applicant, but if any such applicant shall make a new application, and a license shall be again refused, said fee shall not in that case be refunded. And said commissioners shall account semi-annually on the first Monday of December and June, with the treasurer of the State for the sums received by them for licenses, and shall be paid by the State at the time of such accounting, the money necessarily expended by them for stationery and printing, and compensation for their services at the rate of three hundred dollars per annum to each commissioner; *Provided*, That if the amounts received by said commissioners for said licenses shall not be sufficient to pay them said sums for services in full, such amounts shall be apportioned *pro rata* among said commissioners, and their charges for expenses for stationery and printing, and for services, shall be audited and approved by the comptroller in the proportion aforesaid, who shall draw his order upon the treasurer therefor.

SEC. 3. Section eight of said chapter is repealed.

SEC. 4. Section ten of said chapter is amended to read as follows: Every person who shall sell arsenic, strychnine, corrosive sublimate, or prussic acid, shall affix to the package sold by him a label, plainly marked with his name, date of sale, and the word "poison," and shall enter on a book kept by him for that purpose, the name of the purchaser, the date of sale, and the quantity sold; which book shall be kept open for public inspection, carefully preserved, and when he shall close his business, or remove from the town in which such business is carried on, or when said book shall be filled with such entries, it shall be deposited by him in the office of the town clerk of the town in which he may conduct his business; and any person who shall violate the preceding provision of this section, or who, when purchasing the articles herein-named, shall give a false or fictitious name to the vendor thereof, shall be fined not less than ten dollars nor more than one hundred dollars.

SEC. 5. Every person who shall sell any of the articles named in the schedule accompanying this section, marked Schedule A, except when prescribed by a practicing physician, or sold at wholesale to licensed pharmacists, or for use in manufactures or the arts, shall label the bottle, box, or wrapper containing any such article, with a label upon which shall be plainly written or printed the word "poison," and any person violating the provisions of this section shall be fined one dollar.

SCHEDULE A.

Acid carbolic, ammoniated mercury, acid muriatic, chloroform, acid nitric, tinct. aconite, acid sulphuric, tinct. belladonna, acid oxalic, tinct. digitalis, creosote, tinct. opium, extract belladonna, tinct. veratrum viride, sugar of lead, Paris green, morphine, croton oil, nux vomica, cobalt, oil almond bitter, opium, oil tansy, cocculus indicus, cyanide potassium, aqua ammonia, red oxide mercury.

SEC. 6. Every person conducting the business of pharmacy in towns where said chapter one hundred and twenty-two of the public acts passed at the January session, A.D. 1881, has not heretofore been in force, shall, within ninety days from the approval hereof, make application for a license in the manner provided by section four of said chapter, and said license shall be granted such applicants in the manner and upon the terms and conditions set forth in said chapter and these amendments thereto.

APPROVED, March 15th, 1882.

CHAPTER CVII.—AN ACT *to Regulate and Restrain the Sale of Spirituous and Intoxicating Liquors.*

PART IV. OF LICENSES AND LICENSEES.

SEC. 2. No person shall receive a license for the sale of spirituous and intoxicating liquors until he shall have filed with the county commissioners a joint and several bond to the treasurer of said county in the sum of three hundred dollars, with sufficient surety, conditioned for the due observance of all the provisions of Part VI of this act, and no person shall be a surety upon such bond who is himself a licensed dealer in spirituous and intoxicating liquors while the bond upon which he is principal is in force; nor shall the same person be at the same time surety on more than one license bond. And whenever the person so licensed shall be convicted of a violation of any of the provisions of Part VI of this act, and no appeal is pending, said bond shall thereupon become forfeited, and the treasurer of said county shall, in his own name, institute suit upon said bond for the benefit of said county, and upon due proof of said conviction, the court before which said suit is brought shall render judgment in favor of said treasurer for the entire amount of said bond with costs. Every person, *except a licensed druggist,* to whom any such license shall be granted, shall pay to said county commissioners a sum not less than one hundred dollars nor more than five hundred dollars, as said county commissioners may determine in each particular case, and in towns of not over three thousand population the license fee, except to wholesale dealers and licensed druggists, shall be one hundred dollars for each license for the sale of spirituous and intoxicating liquors, and the sum of fifty dollars for each license for the sale of ale, lager beer, or cider sold to be drunk on the premises, and Rhine wine only; and whensoever a license shall be granted for less than one year, the person to whom such license is granted shall pay such a proportion of the annual license fee as such county commissioners may judge proper. *Any druggist, regularly licensed by the commissioners of pharmacy, may be licensed to use spirituous and intoxicating liquors for compounding prescriptions, and to sell spirituous and intoxicating liquors upon the prescription of any practicing physician, upon the payment of a fee of twelve dollars, but druggists doing business in towns containing less than five thousand inhabitants shall only be required to pay ten dollars for such license; but no license so issued to any such druggist shall authorize the sale or delivery of any spirituous and intoxicating liquors to be drunk upon the premises or be sold otherwise than upon such prescription.*

APPROVED, April 25th, 1882.

IV. PHARMACY LAW OF GEORGIA.

AN ACT *to Establish a Board of Pharmaceutic Examiners, and to Prescribe the Powers and Duties of said Board, and to Regulate the Compounding and Vending of Medicines, Drugs, and Poisons in the State of Georgia, and to Provide a Penalty for the Infringement of the Provisions of this Act.*

PREAMBLE.

WHEREAS, In all civilized countries, it has been found necessary to restrict the traffic in medicines and poisons, and to provide by law for the regulation of the delicate and responsible business of compounding and dispensing the powerful agents used in medicines; and whereas, the safety and welfare of the public are endangered by the sale of poison by unqualified or ignorant persons; and whereas, the power of physicians to overcome disease depends greatly upon their ability to obtain good and unadulterated drugs and skilfully prepared medicines, and the sophistication and adulteration of drugs and medicines is a species of fraud which should be prevented and suitably punished; therefore,

SECTION 1. *The General Assembly of the State of Georgia do enact:* That, within sixty days after the passage of this act, the governor of the State shall appoint five experienced druggists or practical pharmacists, who shall have been actively engaged in the drug business within this State for the last three years immediately preceding their appointment, and these five druggists or practical pharmacists, so appointed, shall constitute the Board of Pharmaceutic Examiners, and who shall hold their office for a term of three years, or until their successors shall have been legally appointed and qualified. That three members of that board at any regular, called or adjourned meeting shall constitute a quorum for the transaction of business. That any vacancy which may occur in said board by reason of death, resignation, or otherwise, shall be filled by the governor for the unexpired term.

SEC. 2. *Be it further enacted,* That immediately, and before entering upon the duties of said office, the members of said board shall take the oath prescribed by the constitution of the State for State officers, and shall file the same in the office of the secretary of state, who, upon receiving the said oaths of office, shall issue to each of said examiners a certificate of appointment.

SEC. 3. *Be it further enacted,* That immediately after the appointment and qualification of said examiners, they shall meet and organize as a Board of Pharmaceutic Examiners, elect a chairman and adopt such rules, regulations, and by-laws as they shall deem necessary to carry into execution the provisions of this act.

SEC. 4. *Be it further enacted,* That said board shall meet at least once every twelve months at such place as a majority of the board may determine, and that the board may also hold special meetings as frequently and at such places as the proper discharge of the duties shall require; the same to be convened by order of the chairman, and the rules or by-laws shall provide for the giving of proper notice of the time and place of all such meetings to the members of the board, and to the public.

SEC. 5. *Be it further enacted,* That it shall be the duty of the said board to grant licenses: 1st. To pharmacists who, after three years' experience in a drug store, kept by a licensed apothecary or pharmacist, have graduated in a college of pharmacy acknowledged by the American Pharmaceutical Association, and who shall exhibit to the said board a diploma of the same. 2d. To pharmacists who have obtained a diploma from an authorized foreign college or institution, or examining board, and who shall exhibit the same to the Board of Pharmaceutical Examiners. 3d. To physicians who are graduates of a regular medical college, and who shall exhibit their diplomas to said board; also to druggists who shall produce to said board satisfactory evidence of having been engaged in the drug business for a period of ten years next preceding the time of application; also to druggists who have attended a college of pharmacy acknowledged by the American Pharmaceutical Association for at least one term or session, and who have been engaged in the drug business for at least nine years previous to the time of applying for said license. 4th. To druggists who, after three years' experience in a drug store kept by a licensed apothecary or pharmacist, shall have passed a satisfactory examination before said Board of Pharmaceutic Examiners. All licenses granted shall be signed by a majority of the whole board, and shall specify the ground upon which said license is granted, and shall be in such form as the board shall prescribe.

SEC. 6. *Be it further enacted,* That all persons applying for examination and license, shall pay to the Board of Pharmaceutic Examiners the sum of fifteen dollars, and, if passing the examination, shall be furnished with the license as hereinbefore provided, for which no further fee shall be required or paid. Should the applicant fail to stand a satisfactory examination, no fee shall be required for a subsequent examination, such subsequent examination not to be granted within six months after the first. And it shall be the duty of the board to keep a record of its transactions in a book to be kept for that purpose, by one of its members, said book to be turned over to their successors in office.

SEC. 7. *Be it further enacted*, That all persons now lawfully engaged in the compounding and vending of medicines, drugs, and poisons in this State, shall, on or before December 1st, 1881, and every person who shall be hereafter duly licensed under the provisions of this act, shall, before engaging in any business under said license, register in the office of the ordinary of the county wherein he resides, or intends to conduct said business, in a book to be kept for that purpose, by said ordinary, his name, nationality, and credentials, and date thereof, under which he is entitled to engage in such vocation. For each registration the ordinary shall receive fifty cents, to be paid by the party so registering, and a certificate of such registration, stating the terms of same, shall be given him by said ordinary.

SEC. 8. *Be it further enacted*, That no person shall engage in the compounding or vending of medicines, drugs, or poisons, within this State without a full compliance with this act, except (1) such druggists as are exempt from the operations of the present law by the statutes of the State of Georgia, and such druggists as have heretofore obtained license, and are legally authorized by existing laws, to compound and vend drugs, poisons, and chemicals; (2), physicians putting up their own prescriptions, and dispensing medicines from their own office; (3), merchants selling family medicines not poison, as prescribed and allowed by section 1409 of the code of 1873, of Georgia; (4), assistants in drug stores where the manager has complied with the requirements of this act.

SEC. 9. *Be it further enacted*, That any person who shall violate the provisions of either of the two preceding sections of this act, or shall register fraudulently, shall be guilty of a misdemeanor, and upon conviction shall be punished by fine, not to exceed one hundred dollars, imprisonment, not to exceed three months, either or both, at the discretion of the board. In all cases of prosecution under this act, the burden shall be upon the defendant to show his authority.

SEC. 10. *Be it further enacted*, That all the fees for examination and license, and one-half of the fines collected from convictions under this act, shall be paid to the Board of Pharmaceutic Examiners, to defray the expenses of the same, and as compensation for their services.

SEC. 11. *Be it further enacted*, That this act shall take effect from and after the date of its passage.

SEC. 12. Repeals conflicting laws.

A. O. BACON,
Speaker House of Representatives.
J. S. BOYNTON,
President of the Senate.

APPROVED, September 29th, 1881.

ALFRED H. COLQUITT,
Governor.

V. LAWS OF INDIANA, REFERRING TO DRUGGISTS.

PUBLIC OFFENCES.

SECTION 93. Whoever prints or publishes any advertisement of any secret drug or nostrum, purporting to be for the exclusive use of females, or which cautions females against their use when in a condition of pregnancy, or in any way publishes any account or description of any drug, medicine, instrument, or apparatus for preventing conception, or for procuring abortion or miscarriage, or sells or gives away, or keeps for sale or gratuitous distribution, any newspaper, circular, pamphlet, or book containing such advertisement, account, or description, or any secret drug or nostrum purporting to be exclusively for the use of females, or for preventing conception, or procuring abortion or miscarriage, shall be fined not more than five hundred dollars nor less than five dollars, to which may be added imprisonment in the county jail not more than six months nor less than ten days.

Sec 191 It shall be unlawful for any druggist or druggist's clerk to sell, barter, or give away any spirituous, vinous, malt, or other intoxicating liquor on Sunday, or upon the fourth day of July, the first day of January, the twenty-fifth day of December, commonly called Christmas, Thanksgiving day, or any legal holiday, or upon the day of any State, county, township, primary, or municipal election in the township, town, or city where the same may be holden, or between the hours of eleven o'clock P.M. and five o'clock A.M. of any day, unless the person, to whom the same is sold, bartered, or given, shall have first procured a written prescription therefor from some regular practicing physician of the county where the same is so sold, bartered, or given away. And any person so offending shall be fined in any sum not more than fifty dollars, nor less than ten dollars, to which may be added imprisonment in the county jail not more than sixty days nor less than ten days.

VI. LAWS OF IOWA REFERRING TO PHARMACISTS AND DRUGGISTS.

Amended Pharmacy Law (See Proceedings, 1880, p. 579).

(Chapter LXXV, of the acts of the XVIIIth General Assembly, as amended by Chapter CXXXVII of the XIXth General Assembly.)

An Act *to Regulate the Practice of Pharmacy, and the Sale of Medicines and Poisons.*

Section 1. *Be it enacted by the General Assembly of the State of Iowa:* That from and after the passage of this act it shall be unlawful for any person, not a registered pharmacist within the meaning of this act, to conduct any pharmacy, drug store, apothecary shop, or store for the purpose of retailing, compounding, or dispensing medicines or poisons for medicinal use, except as hereinafter provided.

Sec. 2. That it shall be unlawful for the proprietor of any store or pharmacy to allow any person except a registered pharmacist to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to, and under the supervision of, a registered pharmacist. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be liable to a fine of not less than twenty-five dollars, nor more than one hundred dollars, for each and every such offence.

Sec. 3. The governor, with the advice of the executive council, shall appoint three persons from among the most competent pharmacists of the State, all of whom shall have been residents of the State for five years, and of at least five years' practical experience in their profession, who shall be known and styled as commissioners of pharmacy for the State of Iowa; one of whom shall hold his office for one year, one for two years, and the other for three years, and each until his successor shall be appointed and qualified; and each year thereafter another commissioner shall be so appointed for three years, and until a successor be appointed and qualified. If a vacancy occur in said commission, another shall be appointed, as aforesaid, to fill the unexpired term thereof. Said commissioners shall have power to make by-laws and all necessary regulations for the proper fulfilment of their duties under this act, without expense to the State.

SEC. 4. The commissioners of pharmacy shall register in a suitable book, a duplicate of which is to be kept in the secretary of state's office, the names and places of residence of all persons to whom they issue certificates, and dates thereof. Druggists and pharmacists who were registered without examination forfeit their registration when they have voluntarily sold, parted with, or severed their connection with the drug business for a period of two years at the place designated in certificate of registration; should such party who has thus forfeited his registration wish to re-engage in the practice of pharmacy, he is required to be registered by examination as per section 5. Every registered pharmacist who desires to continue his profession, shall, on or before the twenty-second day of March of each year, pay to the commission of pharmacy the sum of one dollar, for which he shall receive a renewal of his certificate unless his name has been stricken from the register for violation of law. It shall be the duty of each registered pharmacist, before changing his locality as designated in his certificate of registration, to notify the secretary of the commission of pharmacy of his new place of business, and for recording the same and certification thereto the secretary shall be entitled to receive fifty cents for each certificate. It shall be the duty of every registered pharmacist to conspicuously post his certificate of registration in his place of business. Any person continuing in business, who shall fail or neglect to procure his annual renewal of registration, or who shall change his place of business without complying with this section, or who shall fail to conspicuously post his certificate of registration in his place of business, shall for each such offence be liable to a fine of ten dollars for each calendar month during which he is so delinquent.

SEC. 5. That the said commissioners of pharmacy shall, upon application, and at such time and place, and in such manner as they may determine, examine, either by a schedule ot questions, to be answered and subscribed to under oath, or orally, each and every person who shall desire to conduct the business of selling at retail, compounding, or dispensing drugs, medicines, or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as pharmacists, and if a majority of said commissioners shall be satisfied that said person is competent and fully qualified to conduct said business of compounding or dispensing drugs, medicines, or chemicals for medicinal use, or to compound and dispense physicians' prescriptions, they shall enter the name of such person as a registered pharmacist in the book provided for in section 4 of this act; and that all graduates in pharmacy, having a diploma, from an incorporated college or school of pharmacy, that requires a practical experience in pharmacy of not less than four years before granting a diploma, shall be entitled to have their names registered as pharmacists by said commissioners of pharmacy without examination.

SEC. 6. That the commissioners of pharmacy shall be entitled to demand and receive from each person whom they register and furnish a certificate as a registered pharmacist, without examination, the sum of two dollars; and from each and every person whom they examine orally, or whose answers to a schedule of questions are returned subscribed to under oath, the sum of five dollars, which shall be in full for all services. And in case the examination of said person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to present himself for re-examination within any period not exceeding twelve months next thereafter, and no charge shall be made for such re-examination.

SEC. 7. Every registered pharmacist shall be held responsible for the quality of all drugs, chemicals, and medicines he may sell or dispense, with the exception of those sold in the original packages of the manufacturer, and also those known as "patent medicines;" and should he knowingly, intentionally, and fraudulently adulterate, or cause to be adulterated, such drugs, chemicals, or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof, be liable to a penalty not exceeding one hundred dollars, and in addition thereto, his name be stricken from the register.

SEC. 8. Apothecaries registered as herein provided shall have the right to keep and sell, under such restrictions as herein provided, all medicines and poisons authorized by the National, American, or United States Dispensatory and Pharmacopœia as of recognized medicinal utility; *Provided, That nothing herein contained shall be construed so as to shield an apothecary or pharmacist who violates or in any wise abuses this trust for the legitimate and actual necessities of medicine, from the utmost rigor of the law relating to the sale of intoxicating liquors, and in addition thereto his name shall be stricken from the register.*

SEC. 9. It shall be unlawful for any person from and after the passage of this act to retail any poisons enumerated in schedules "A" and "B," except as follows:

SCHEDULE A.

Arsenic, and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia, and all other poisonous vegetable alkaloids, and their salts, essential oil of bitter almonds, opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce.

SCHEDULE B.

Aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton-root, cantharides, creosote, digitalis, and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid, oxalic acid, without distinctly labelling the box, vessel, or paper in which said poison is contained, and also the outside wrapper or cover, with the name of the article, the word "poison," and the name and place of business of the seller. Nor shall it be lawful for any person to sell or deliver any poison enumerated in schedules "A" and "B," unless, upon due inquiry, it be found that the purchaser is aware of its poisonous character, and represents that it is to be used for a legitimate purpose. Nor shall it be lawful for any registered pharmacist to sell any poisons included in schedule "A" without before delivering the same to the purchaser, causing an entry to be made, in a book kept for that purpose, stating the date of sale, the name and address of the purchaser, the name of the poison sold, the purpose for which it is represented by the purchaser to be required, and the name of the dispenser, such book to be always open for inspection by the proper authorities, and to be preserved for at least five years. The provisions of this section shall not apply to the dispensing of poisons, in not unusual quantities or doses, upon the prescriptions of practitioners of medicine. Nor shall it be lawful for any licensed or registered druggist or pharmacist to retail, or sell, or give away, any alcoholic liquors or compounds as a beverage, and any violations of the provisions of this section shall make the owner or principal of said store or pharmacy liable to a fine of not less than twenty-five dollars, and not more than one hundred dollars, to be collected in the usual manner; and, in addition thereto, for repeated violations of this section his name shall be stricken from the register.

SEC. 10. Any itinerant vendor of any drug, nostrum, ointment, or appliance of any kind, intended for the treatment of diseases or injury, who shall, by writing or printing, or any other method, publicly profess to cure or treat diseases, or injury, or deformity, by any drug, nostrum, or manipulation, or other expedient, shall pay a license of one hundred dollars per annum, to be paid to the treasurer of the commission of pharmacy, whereupon the secretary of said commission shall issue such license for one year. Any person violating this section shall be deemed guilty of a misdemeanor and shall, upon conviction, pay a fine of not less than twenty-five dollars. All moneys received for license to be reported to the auditor of state. The sum of one thousand dollars per year, or as much thereof as may be necessary, is hereby appropriated out of the moneys so received for licenses for the expenses of said commission, all exceeding said amount to be paid into the State treasury.

Sec. 11. That any person who shall procure, or attempt to procure, registration for himself or for another under this act, by making, or causing to be made, any false representations, shall be deemed guilty of a misdemeanor, and shall upon conviction thereof, be liable to a penalty of not less than twenty-five nor more than one hundred dollars, and the name of the person so fraudulently registered shall be stricken from the register. Any person, not a registered pharmacist, as provided for in this act, who shall conduct a store, pharmacy, or place for retailing, compounding, or dispensing drugs, medicines, or chemicals, for medicinal use, or for compounding or dispensing physicians' prescriptions, or who shall take, use, or exhibit the title of registered pharmacist, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be liable to a penalty of not less than fifty dollars, nor more than two hundred dollars.

Sec. 12. This act shall not apply to physicians putting up their own prescriptions, nor to the sale of proprietary medicines manufactured in the State when same are sold and distributed by agents from an established place of business.

Sec. 13. This act being deemed of immediate importance, shall take effect from and after its publication in the Iowa *State Register* and Iowa *State Leader*, newspapers published at Des Moines, Iowa.

Sec. 14. All acts and parts of acts in conflict with this act, are hereby repealed.

Approved, March 17th, 1882. Published and in effect, March 18th, 1882.

Pharmacy Amendment; Substitute for House Files, Nos. 161, 166, 196.

A Bill *for an Act to Amend Section 8, Chapter 75, of the Laws of the XVIII General Assembly, also for an Act to Repeal Section* 1527, *and to Amend Section* 1529, *and Section* 1537, *of the Code of* 1873, *in Relation to the Sale of Intoxicating Liquors.*

Section 1. *Be it enacted by the General Assembly of the State of Iowa:* That section eight (8), chapter seventy-five (75), of the laws of the eighteenth (18) General Assembly of the State of Iowa, be, and it is hereby amended, by striking out all after the word "*provided*," in the fifth (5) line of said section, and inserting in lieu thereof the following: "That all the provisions of chapter six (6), title eleven (11), of the Code of 1873, and of any laws that may be hereafter made, amendatory or in addition thereto, regulating the sale of intoxicating liquors for mechanical, culinary, medicinal, or sacramental purposes, shall be applicable to persons selling liquors under this act, or the act to which this is amendatory; *Provided further*, That any registered pharmacist, who shall be convicted of any violation of said chapter six (6), title eleven (11), of the Code, or of chapter 75, of the laws of the eighteenth (18) General Assembly, or any law hereafter made amendatory thereto, shall have his name stricken from the register by the commissioners of pharmacy."

Sec. 2. That section fifteen hundred and twenty-seven (1527), of the Code of 1873, be, and the same is hereby repealed.

Sec. 3. That section fifteen hundred and twenty-nine (1529), of the Code of Iowa, be, and the same is hereby amended, by striking out the words, "upon the presentation of such certificate and bond to the county auditor," and inserting in lieu thereof the following words, to wit, "upon application for a permit, and filing the proper bond with the county auditor."

Sec. 4. That section fifteen hundred and thirty-seven (1537), of the Code of Iowa, be, and the same is hereby amended, by striking out the following words, to-wit, "no person having a permit to sell intoxicating liquors under this chapter, shall sell the same at a greater profit than thirty-three per cent. on the cost of the same, including freights and."

Sec. 5. All acts, or parts of acts, in conflict with this act, are hereby repealed.

VII. KENTUCKY POISON LAW.

An Act *to Regulate the Sale of Poison in the Commonwealth of Kentucky.*

Section I. *Be it enacted by the General Assembly of the Commonwealth of Kentucky:* It shall be unlawful for any person to sell, either by wholesale or retail, any poison without distinctly labelling the bottle, box, or paper, and wrapper or cover in which said poison is contained, with the name of the article, the word poison, and the name and place of business of the seller.

Sec. 2. It shall likewise be unlawful for any person to sell any poison without being satisfied that the buyer has attained his lawful majority, and that the poison is purchased for legitimate use.

Sec. 3. It shall be the duty of every person selling a poison at retail before delivering the same to the buyer, to make, or cause to be made, an entry in a book kept for that purpose only, stating in the form set forth in schedule A, annexed to this act, the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, and the purpose for which it is stated by the purchaser to be required; and such book is to be preserved for at least five years after the date of the last entry, and is to be always open to the inspection of the coroner and officers of the different courts.

Sec. 4. *Be it provided,* That no article shall be considered a poison within the meaning of this act unless such article be enumerated in schedule B, annexed to this act, or shall hereafter be declared a poison by law.

Sec. 5. *Be it also provided,* That nothing, hereintofore contained, shall apply to or in any manner whatever interfere with, the compounding and dispensing of medicines and poisons upon the prescription of medical practitioners.

Sec. 6. Any person who shall violate any of the provisions of this act shall be sentenced, upon conviction, to pay a fine of not less than $5 nor more than $100 for each offence.

Sec. 7. This act shall take effect from and after its passage.

Schedule A.

Form in which dealers in poison shall keep their poison book:

Date.	Name of purchaser.	Name and quantity of poison sold.	For what purpose said to be required.	Remarks.

Schedule B.

The following articles shall be considered poisons within the meaning of the "Act to regulate the sale of poisons:"

Aconite, root and leaves, and the following products and preparations made from them: Aconitia and its salts, extract, fluid extract, tincture. Arsenic, and the following compounds and preparations: Arsenic acid and its salts, arsenious acid and its salts, arsenic iodide, Donovan's solution, Fowler's solution, hydrochloric solution of arsenic, solution of arseniate of sodium, Paris green. Belladonna, root and leaves, and the following products and preparations made from them: Atropia and its salts, extract, fluid extract, tincture. Cannabis Indica, and the following preparations made from it: Extract, fluid extract, tincture. Cantharides and the tincture. Cotton root and root bark, and all of its preparations. Croton oil. Cyanide of potassium. Digitalis, and the following products and preparations made from it: Digitalin, extract, fluid extract, tincture. Ergot and all of its preparations. Fish berries and all of its preparations. Hydrocyanic acid. Mercuric ammonia chloride (white precipitate). Mercuric chloride (corrosive sublimate). Mercuric iodide (red iodide of mercury). Mercuric nitrate (salt and its solutions). Mercuric oxide (red and yellow precipitate). Nux vomica, and the following products and preparations made from it: Strychnia and its salts, extract, fluid extracts, tincture. Opium, and the following products and preparations made from it: Morphia and its salts, tincture (laudanum and deodorized), acetic tincture, wine, vinegar, extract; Battly's sedative, solution of bimeconate of morphia, solution of morphia. Savine and the fluid extract. Veratria. Veratrum viride and veratrum album, and the following preparations made from them: Fluid extract, extract, tincture. Volatile oil of bitter almonds. Volatile oil of pennyroyal. Volatile oil of savine. Volatile oil of tansy. Proprietary or secret medicines recommended, sold, or advertised as emmenagogues or parturients, and all such as are known or advertised to contain a large proportion of opium or other powerful narcotic.

VIII. FOOD AND DRUG ADULTERATION LAW OF LOUISIANA.

AN ACT *to Define and Punish Adulteration of Drugs, Food, and Drink, providing for Stamping Articles Manufactured, Sold, or Offered for Sale within this State, and Prescribing Punishment for its Violation, and Prescribing Certain Duties of the Board of Health Relative to Samples and their Analysis and Fees therefor.*

SECTION 1. *Be it enacted by the General Assembly of the State of Louisiana:* No person shall within this State manufacture, have, offer for sale or sell any article of food or drugs which is adulterated, and any person violating this provision shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine not exceeding $50 for the first offence, and not exceeding $100 for each subsequent offence.

SEC. 2. *Be it further enacted, etc.,* An article shall be deemed adulterated within the meaning of this act in the case of drugs, if when sold under a name recognized in the United States Pharmacopœia its strength or purity fall below the professed standard under which it is sold. And in the case of food or drink if any substance has been mixed with it so as to lower or injuriously affect its quality or strength, or if any inferior or cheaper substance or substances have been substituted wholly or in part for the pure article, or to mix any substance in food or drink so sold, or to sell the same so mixed, which by its use will affect in any extent the public health or injure the health of the consumer of said food or drink.

SEC. 3. *Be it further enacted, etc.,* No person shall manufacture, sell, or offer for sale within this State any drugs, groceries, such as sugar, coffee, tea, butter, cheese, or any other article to be consumed as food or drink, unless the package when sold at wholesale or the package from which it is taken when sold at retail be stamped in plain large letters, showing the true quality and kind of the articles sold within the meaning of this act, and every person violating the provisions of this section shall be deemed guilty of a misdemeanor, and shall, upon conviction, pay a fine of not less than $25, nor more than

$50, or be sentenced to imprisonment for not more than ten days, or both, at the discretion of the court.

SEC. 4. *Be it further enacted, etc.,* That any person who knowingly sells any article of food or drink with a stamp as provided aforesaid, and the article so sold is not the article it purports to be or of inferior quality shall be deemed guilty of a misdemeanor, and upon conviction shall pay a fine not exceeding $100.

SEC. 5. *Be it further enacted, etc.,* The State Board of Health shall take cognizance of the interests of the public health as it relates to the sale of food and drugs, and the adulteration of the same, and make all necessary investigations and inquiries relative thereto, and at any time when in their judgment necessary they shall chemically analyze any drug or drugs, articles of food and drink, and shall publish the results of their analysis, together with the name of the article or articles analyzed in case the same be deleterious to the public health and to warn the public against its consumption. On application of any citizen they shall also analyze the article or articles presented for analysis by him, but in this case he shall pay such fees for said analysis as the Board of Health may fix.

SEC. 6. *Be it further enacted, etc.,* On application of the Board of Health through the officer to be selected by them, every person manufacturing or selling any article of food or drugs shall be bound to furnish a sample of the said articles so manufactured or sold to the said board sufficient in quantity to serve the purpose of analysis, under a penalty of not more than $20, to be recovered before any court of competent jurisdiction.

SEC. 7. *Be it further enacted, etc.,* That this act shall take effect sixty days after the promulgation thereof.

R. N. OGDEN,
Speaker of the House of Representatives.
GEORGE L. WALTON,
President pro tem. of Senate.

APPROVED, July 5th, 1882.

S. D. MCENERY,
Governor of the State of Louisiana.

A true copy:
WBLL. A. STRONG,
Secretary of State.

IX. FOOD AND DRUG ADULTERATION LAW OF MASSACHUSETTS.

CHAPTER CCLXIII.—AN ACT *Relating to the Adulteration of Food and Drugs.*

SECTION 1. *Be it enacted, etc., as follows:* No person shall, within this commonwealth, manufacture for sale, offer for sale or sell any drug or article of food which is adulterated within the meaning of this act.

SEC. 2. The term "drug" as used in this act shall include all medicines for internal or external use, antiseptics, disinfectants, and cosmetics. The term "food" as used herein shall include all articles used for food or drink by man.

SEC. 3. An article shall be deemed to be adulterated within the meaning of this act:

(*a.*) In the case of drugs: (1.) If, when sold under or by a name recognized in the United States Pharmacopœia, it differs from the standard of strength, quality, or purity laid down therein; (2.) If, when sold under or by a name not recognized in the United States Pharmacopœia, but which is found in some other pharmacopœia, or other standard work on *materia medica*, it differs materially from the standard of strength, quality, or purity laid down in such work; (3.) If its strength or purity falls below the professed standard under which it is sold.

(*b.*) In the case of food: (1.) If any substance or substances have been mixed with it so as to reduce, or lower, or injuriously affect its quality or strength; (2.) If any inferior or cheaper substance or substances have been substituted wholly or in part for it; (3.) If any valuable constituent has been wholly or in part abstracted from it; (4.) If it is an imitation of, or is sold under the name of another article; (5.) If it consists wholly or in part of a diseased, decomposed, putrid, or rotten animal or vegetable substance, whether manufactured or not; or, in the case of milk, if it is the produce of a diseased animal; (6.) If it is colored, coated, polished, or powdered, whereby damage is concealed, or if it is made to appear better or of greater value than it really is. (7.) If it contains any added poisonous ingredient, or any ingredient which may render it injurious to the health of a person consuming it.

The State Board of Health, Lunacy, and Charity may from time to time declare certain articles or preparations to be exempt from the provisions of this act; and the provisions hereof shall not apply to mixtures or compounds recognized as ordinary articles of food, provided that the same are not injurious to health, and are distinctly labelled as mixtures or compounds.

SEC. 4. The State Board of Health, Lunacy, and Charity shall prepare and publish from time to time lists of the articles, mixtures, or compounds declared to be exempt from the provisions of this act, in accordance with the preceding section. The said board shall also from time to time fix the limits of variability permissible in any article of food, or any drug, or compound, the standard of which is not established by any national pharmacopœia.

SEC. 5. The State Board of Health, Lunacy, and Charity shall take cognizance of the interests of the public health relating to the sale of drugs and food and the adulteration of the same, and shall make all necessary investigations and inquiries in reference thereto, and for these purposes may appoint inspectors, analysts and chemists, who shall be subject to its supervision and removal.

Within thirty days after the passage of this act the said board shall adopt such measures as it may deem necessary to facilitate the enforcement hereof, and shall prepare rules and regulations with regard to the proper methods of collecting and examining drugs and articles of food. Said board may expend annually an amount not exceeding three thousand dollars for the purpose of carrying out the provisions of this act.

SEC. 6. Every person offering or exposing for sale, or delivering to a purchaser, any drug or article of food included in the provisions of this act, shall furnish to any analyst or other officer or agent appointed hereunder, who shall apply to him for the purpose and shall tender him the value of the same, a sample sufficient for the purpose of the analysis of any such drug or article of food which is in his possession.

SEC. 7. Whoever hinders, obstructs, or in any way interferes with any inspector, analyst, or other officer appointed hereunder in the performance of his duty, and whoever violates any of the provisions of this act, shall be punished by fine not exceeding $50 for the first offence and not exceeding $100 for each subsequent offence.

SEC. 8. This act shall take effect at the expiration of ninety days after its passage.

APPROVED, May 26th, 1882.

X. ADULTERATION AND POISON LAWS OF MINNESOTA.

STATUTES OF 1878, CHAPTER CI.

OFFENCES AGAINST THE PUBLIC HEALTH.

Adulteration of Drugs and how Punished.

§ 4 (SECTION 3). Whoever fraudulently adulterates, for the purpose of sale, any drug or medicine, or sells any drug or medicine knowing it to be adulterated, or offers the same for sale, shall be punished by imprisonment in the county jail not more than one year, or by a fine not exceeding $300, and such adulterated drugs and medicines shall be forfeited and destroyed by order of the court.

Selling Poison without Label.

§ 7 (Sec. 6). Every apothecary, druggist, or other person who sells and delivers any arsenic, corrosive sublimate, prussic acid, or any other active poison, without having the word "Poison" and the true name thereof in English, written or printed upon the label attached to the vial, box, or parcel containing the same, shall be punished by a fine not exceeding $100.

Sec. 1. If any druggist or other person sells or gives away any arsenic, strychnine, corrosive sublimate, or prussic acid, not upon the written prescription of a physician, and fails to keep a record of the date of such sale or gift, the article, and amount thereof sold or given away, and the person to whom delivered, he shall be fined not exceeding $50 for each neglect.

Sec. 2. Whoever purchases any such poison and gives a false or fictitious name, shall be punished in the same manner by a fine not exceeding $50.

State of Minnesota, Department of State.

I hereby certify that the foregoing is a true and correct copy of Sections 4, 7, 8, and 9, of Chapter 101, Statutes of 1878.

Witness my hand and the great seal of the State this 10th day of August, 1882.

[SEAL.] Fred. von Baumbach,
Secretary of State.

XI. ADULTERATION AND POISON LAWS OF TENNESSEE.

From the Statutes of Tennessee.

Section 4829. It shall be a misdemeanor for any person to adulterate, for the purpose of sale, any drug or medicine, in such manner as to lessen the efficacy or change the operation of such drug or medicine, or to make them injurious to health; or sell them knowing that they are thus adulterated; and such adulterated drugs and medicines shall be forfeited and destroyed.

Sec. 4830. Any person who sells and delivers any poisonous liquid or substance, without having the word "poison" written or printed on the label attached to the vial, box, or parcel in which the same is sold, shall, on conviction, be fined not less than twenty nor more than one hundred dollars.

Sec. 4830 *a*. Any person who sells or delivers any poisonous liquid or substance, in addition to having the word "poison" printed or written on the label thereof as now required by law, shall note in a book kept by such person for that purpose, the name of the person to whom such poison was delivered, the date of delivery and the kind and amount of such poison so delivered, and shall keep such book open for public inspection.

Sec. 4830 *b*. Any person violating the provisions of this act, shall, on conviction, be fined not less than twenty nor more than one hundred dollars. *Provided*, that the provisions of this act shall not apply to the prescriptions of regular practicing physicians.

Sec. 4831. Any person, except a practicing physician in prescribing for a patient, who sells and delivers any tartar emetic, laudanum, morphine, or other drug or medicine, without having the common name thereof written or printed on a label attached to the vial, box, or parcel containing the same, shall, on conviction, be punished as provided in the preceding section.

Sec. 4832. Any person who sells to any slave or free child under ten years of age any poisonous liquid or drug, without an order in writing from the owner or master of such slave, or the parent, guardian, or other person having the legal care of such child, designating such drug either by its name or by its effects, shall, on conviction, be punished as provided in said section, and may also be imprisoned in the county jail not more than three months.

XII. ADULTERATION LAW OF TEXAS.

The Revised Statute of Texas, 1879.

Article 395. If any person shall fraudulently adulterate for the purpose of sale, any drug or medicine, in such a manner as to change the operation of such a drug or medicine, or render the same worthless, or injurious to health, he shall be punished by fine, not less than fifty nor more than five hundred dollars.

XIII. AMENDED PHARMACY LAW OF WEST VIRGINIA.

(See Proceedings, 1881, p. 391.)

An Act *To Regulate the Practice of Pharmacy and the sale of Medicines and Poisons.*

(Chapter 52, passed February 21, 1881, as amended and re-enacted by Chapter 112 of the Acts of 1882 adjourned session), passed March 25, 1882.)

Sec. 1. *Be it enacted by the Legislature of West Virginia:* It shall be unlawful for any person, not a registered pharmacist, or who does not employ as his salesman a registered pharmacist, within the meaning of this act, to conduct any pharmacy, drug store, apothecary shop or store for the purpose of retailing, compounding or dispensing medicines or poisons for medical use, except as hereinafter provided.

Sec. 2. It shall be unlawful for the proprietor of any store or pharmacy to allow any person except a registered pharmacist to compound or dispense the prescriptions of physicians, or to retail or dispense the poisons, named in schedules A and B herein, for medical use, except as an aid to, or under the supervision of a registered pharmacist.

Sec. 3. The Board of Public Works shall appoint one person from each Congressional district, from among the most competent pharmacists of the State, all of whom shall have been residents of the State for five years, and of at least five years' practical experience in their profession, who shall be known as "Commissioners of Pharmacy for the State of West Virginia," one of whom shall hold his office for one year, one for two years, one for three years, and one for four years, and each until his successor shall be appointed and qualified; and each year thereafter one commissioner shall be so appointed for four years, and until a successor be appointed and qualified. If a vacancy occur in said commission, another shall be appointed as aforesaid, to fill the unexpired term thereof. Said commissioners, a majority of whom may act, shall have power to make by-laws, and all necessary regulations for the proper fulfilment of their duties under this act, without expense to the State, and to examine applicants and grant certificates.

Sec. 4. The commissioners of pharmacy shall register, in a suitable book, a duplicate of which is to be kept in the office of the secretary of state, the names and places of business of all persons to whom they issue certificates, and the dates thereof. It shall be the duty of said commissioners of pharmacy to register, without examination, as registered pharmacists, all pharmacists and druggists who are engaged in business in the State of West Virginia, at the passage of this act, as owners or principals of stores or pharmacies for selling at retail, compounding or dispensing drugs, medicines or chemicals for medical use, or for compounding and dispensing physicians' prescriptions; and all assistant pharmacists, not under eighteen years of age, engaged in said stores or pharmacies in the State of West Virginia at the passage of this act, and who have been engaged as such in some store or pharmacy where physicians' prescriptions were compounded and dispensed, for not less than five years prior to the passage of this act; *Provided, however*, That in case of failure or neglect on the part of such person or persons to apply for registration within sixty days after they shall have been notified, they shall undergo an examination such as is provided for in section five of this act.

SEC. 5. That the said commissioners of pharmacy shall, upon application, and at such time and place, and in such manner as they may determine, examine, orally or otherwise, under such regulations as they may by by-law prescribe, each and every person who shall desire to conduct the business of selling at retail, compounding or dispensing drugs, medicines or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as pharmacists; and if a majority of said commissioners shall be satisfied that said person is competent and fully qualified to conduct said business of compounding or dispensing drugs, medicines, or chemicals for medicinal use, or to compound or dispense physicians' prescriptions, they shall enter the name of such person as a registered pharmacist, in the book provided for in section four of this act; and that all graduates in pharmacy, having a diploma from an incorporated college or school of pharmacy, that requires a practical experience in pharmacy of not less than four years before granting a diploma, shall be entitled to have their names registered as pharmacists by said commissioners of pharmacy without examination.

SEC. 6. That the commissioners of pharmacy shall be entitled to demand and receive from each person whom they register and furnish a certificate as a registered pharmacist, without examination, the sum of two dollars; and from each and every person whom they examine orally or otherwise, the sum of five dollars, which shall be in full for all services. And in case the examination of said person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to present himself for re-examination within any period not exceeding twelve months next thereafter, and no charge shall be made for such re-examination.

SEC. 7. Every applicant for registration as a pharmacist shall present to the commissioners of pharmacy satisfactory evidence that he is a person of good moral character and not addicted to drunkenness, and all persons, whether registered pharmacists or not, shall be held responsible for the quality of all drugs, chemicals and medicines they may sell or dispense, with the exception of those sold in the original packages of the manufacturer, and those known as "patent medicines." Any person who shall knowingly, intentionally and fraudulently adulterate or cause to be adulterated any drugs, chemicals or medical preparations, or knowingly sell any adulterated drugs, chemicals or medical preparations, shall be deemed guilty of a misdemeanor, and upon conviction thereof be fined not exceeding one hundred dollars, and if he be a registered pharmacist his name shall be stricken from the register.

SEC. 8. Apothecaries registered as in this act provided, shall have the right to keep and sell, under such restrictions as herein provided, all medicines and poisons, authorized by the National, American or United States Dispensatory and Pharmacopœia, as of recognized utility.

SEC. 9. No druggist or registered pharmacist shall retail any of the poisons enumerated in the following schedules except as hereinafter provided:

SCHEDULE A.

Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia, and all other poisonous vegetable alkaloids and their salts, essential oil of bitter almonds, opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce.

SCHEDULE B.

Aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, digitalis, and their pharmaceutical preparations; croton oil, chloroform, chloral hydrate, sulphate of zinc, sulphate of copper, acetate of lead, mineral acids, carbolic acid and oxalic acid.

Whenever any of the said poisons are sold the box, vessel or paper in which the same is put up shall be distinctly labelled with a device bearing the death's head and cross bones, and also the name of the article, the word "poison," and the name and place of business of the seller. The seller shall also ascertain upon due inquiry that the purchaser is aware of the poisonous character of the drug, and that it is to be used for a legitimate and lawful purpose. He shall also before delivering any of the poisons named in "schedule A" to a purchaser, cause an entry to be made in a book kept for the purpose, which entry shall show the date of the sale, the name and residence of the purchaser, the name and quality of the poison sold, the purpose for which it is to be used as represented by the purchaser, and the name of the dispenser; such book to be always subject to the inspection of the proper authorities, and to be preserved for at least five years from the date of the last entry.

The provisions of this section shall not apply to the dispensing of drugs in not unusual quantities on the prescriptions of physicians.

Nothing in this act contained shall be construed so as to protect any druggist or registered pharmacist from any penalty or forfeiture prescribed in any other law regulating the sale of alcoholic or other intoxicating liquors; and the name of any registered pharmacist who shall be convicted twice of the violation of such law, shall be stricken from the register, and he shall no longer be a registered pharmacist. Nor shall this act be construed to authorize any person to carry on the business of a druggist without having first obtained a license therefor, if such license be required by any other law, or to sell, offer or expose for sale any of the liquors, drinks, mixtures or preparations mentioned in section 1 of chapter 32 of the Code of West Virgina, as amended and re-enacted by chapter 107 of the Acts of 1877, except for medicinal, mechanical or scientific purposes. And if any person carrying on or interested in the business of a druggist shall, in violation of this section, sell any such liquors, drinks, mixtures or preparations, he shall be guilty of a misdemeanor, and for each offence be fined not less than twenty-five nor more than one hundred dollars; and it shall be the special duty of the judge of every circuit court to give this provision in charge to the grand juries of their respective courts. In any prosecution against a person carrying on or interested in the business of a druggist for selling any such liquors, drinks, mixtures or preparations, contrary to law, if the sale be proved, it shall be presumed that such sale was unlawful unless the contrary be shown.

SEC. 10. No person shall procure, or attempt to procure, registration for himself, or for another, under this act, by making, or causing to be made, any false representations, nor shall any person not a registered pharmacist, as provided in this act, conduct a store, pharmacy, or place for retailing, compounding or dispensing drugs, medicines or chemicals for medicinal use, or for compounding or dispensing physicians' prescriptions, or take, use or exhibit the title of a registered pharmacist.

SEC. 11. This act shall not apply to physicians putting up their own prescriptions, nor to any one not doing business in an incorporated city or town who sells such ordinary drugs as are usually kept in country stores, nor to such person in any such city or town in which there is no registered pharmacist engaged in the business of selling drugs; but the term ordinary drugs shall not be held to include any of the poisons named in schedules A and B, nor any intoxicating liquor.

SEC. 12. It shall be the duty of the board to investigate all complaints and charges of non-compliance or violation of the provisions of this act, and to bring the same to the notice of the proper prosecuting officer, as provided for in section 7 of this act, whenever there appears to the board reasonable grounds for such action.

SEC. 13. Every registered pharmacist shall keep his certificate of registration posted in a conspicuous place at his place of business, and any failure so to do shall be deemed and held to be *prima facie* evidence that such person is not a registered pharmacist.

SEC. 14. Any person violating any of the provisions of this act shall be guilty of a misdemeanor, and for every such offence shall be fined not less than twenty-five nor more than one hundred dollars, and (except as provided in section 7 of this act) the name of any person convicted of such violation, shall be stricken from the register and he shall no longer be a registered pharmacist in this State.

It shall be the duty of the clerk of the court in which, or the justice of the peace before whom, any conviction is had, to transmit forthwith a certified copy of the record entry of such conviction to the commissioners of pharmacy, who shall thereupon strike the name of the person so convicted from the register.

All fines collected under any of the provisions of this act shall be paid, one-half to the State school fund, and the other half to the commissioners of pharmacy.

Acts Repealed.

All acts or parts of acts coming within the purview of this act, and inconsistent therewith, are hereby repealed.

PASSED, March 25th, 1882. APPROVED, MARCH 28th, 1882.

[*Note by the Clerk of the House of Delegates.*]

The foregoing act takes effect from its passage, two-thirds of the members elected to each House, by a vote taken by yeas and nays, having so directed.

A true copy from the rolls:

Attest: J. B. PEYTON,
Clerk of the House of Delegates, and Keeper of the Rolls.

XIV. PHARMACY LAW OF WISCONSIN.

CHAPTER CLXVII.—AN ACT *to Regulate the Practice of Pharmacy, the Licensing of Persons to carry on such Practice, and the Sale of Poisons in the State of Wisconsin.*

SECTION 1. *The people of the State of Wisconsin, represented in the Senate and Assembly, do enact as follows:* That it shall hereafter be unlawful for any person, other than a registered pharmacist, to retail, compound, or dispense drugs, medicines, or poisons, or to institute or conduct any pharmacy, store, or shop for retailing, compounding, or dispensing drugs, medicines, or poisons, unless such person shall be a registered pharmacist, or shall employ and place in charge of said pharmacy, store, or shop a registered pharmacist within the full meaning of this act, except as hereinafter provided.

SEC. 2. In order to be registered within the full meaning of this act, all persons must be either graduates in pharmacy, or shall, at the time this act takes effect, be engaged in the business of a dispensing pharmacist on their own account, in the State of Wisconsin, in the preparation of physicians' prescriptions and in the vending and compounding of drugs, medicines, and poisons, or shall be licentiates in pharmacy.

SEC. 3. Graduates in pharmacy shall be considered to consist of such persons as have had four years' practical experience in drug stores where prescriptions of medical practitioners are compounded, and have obtained a diploma from such colleges or schools of pharmacy as shall be approved by the board of pharmacy, such as shall be adjudged by said board of pharmacy as sufficient guarantee of their attainments and proficiency.

SEC. 4. Licentiates in pharmacy shall be such persons as have had two years' practical experience in drug stores wherein the prescriptions of medical practitioners are compounded, and have sustained a satisfactory examination before the State board of pharmacy hereinafter mentioned. The State board may grant certificates of registration to licentiates of such other State boards as it may deem proper, without further examination. It shall be the duty of the board to grant, in towns or villages of less than 500 inhabitants, a minor certificate to such persons as they may deem competent to sell or vend such medicines and compounds as are required by the general public, but such parties shall not be considered competent unless they have had two years' experience in the sale of medicines and compounding physicians' prescriptions; the said certificate shall entitle tbe holder thereof only to registration as assistant pharmacist in towns and villages of over 500 inhabitants.

SEC. 5. Immediately upon the passage of this act, the Wisconsin Pharmaceutical Association shall elect ten reputable and practicing pharmacists doing business in the State, from which number the Governor shall appoint five. The said five pharmacists, duly elected and appointed, shall constitute the Board of Pharmacy of the State of Wisconsin, and shall hold office as respectively designated in their appointments, for the term of one, two, three, four, and five years respectively, as hereinafter provided, and until their successors have been duly appointed and qualified. The Wisconsin Pharmaceutical Society shall, annually thereafter, elect three pharmacists, from which number the Governor of the State shall appoint one to fill the vacancy annually occurring in said board. The term of office shall be five years. In case of resignation or removal from the State of any member of said board or of a vacancy occurring from any cause, the Governor shall fill the vacancy by appointing a pharmacist from the names last submitted, to serve as a member of the board for the remainder of the term.

SEC. 6. The said board shall, within thirty days of its appointment, meet and organize by the selection of a president and secretary from the number of its own members, who shall be elected for the term of one year, and shall perform the duties prescribed by the board. It shall be the duty of the board to examine all applications for registration submitted in proper form; to grant certificates of registration to such persons as may be entitled to the same under the provisions of this act; to cause the prosecution of all persons violating its provisions; to report annually to the Governor and to the Wisconsin Pharmaceutical Society upon the condition of pharmacy in the State, which said report shall also furnish a record of the proceedings of the said board for the year, as well as the names of all pharmacists duly registered under this act. The board shall hold meetings for the examination of applicants for registration and transaction of such other business as shall pertain to its duties, at least once in three months. And the said board shall give thirty days' public notice of the time and place of such meeting. The said board shall also have power to make by-laws for the proper execution of its duties under this act, and shall keep a book of registration, in which shall be entered the names and places of business of all persons registered under this act, which registration book shall also contain such facts as said persons claim to justify their registration. Three members of said board shall constitute a quorum.

SEC. 7. Every person claiming the right of registration under this act, who shall, within three months after the passage of this act, forward to the board of pharmacy satisfactory proof, supported by his affidavit, that he was engaged in the business of dispensing pharmacist on his own account in the State of Wisconsin at the time of the passage of this act, as provided in section 2, shall, upon the payment of the fee hereinafter mentioned, be granted a certificate of registration; *provided*, that in case of failure or neglect to register as herein specified, then such person shall, in order to be registered, comply with the requirements provided for registration as graduates in pharmacy or licentiates in pharmacy within the meaning of this act.

SEC. 8. Any person engaged in the position of assistant clerk in a pharmacy at the time this act takes effect, not less than eighteen years of age, who shall have had at least two years' practical experience in drug stores where the prescriptions of medical practitioners are compounded, and who shall furnish satisfactory evidence to that effect to the State board of pharmacy, shall, upon making application for registration, and upon payment to the secretary of said board of a fee of one dollar within sixty days after this act takes effect, be entitled to a certificate as "registered assistant," which certificate shall entitle him to continue in such duties as clerk or assistant; but such certificate shall not entitle him to engage in business on his own account, except as provided in section 4, or to the certificate of registered pharmacist unless he shall have had at least five years' experience in such stores where the prescriptions of medical practitioners are compounded at the time of the passage of this act. Thereafter he shall pay, annually, to the said secretary, a sum not exceeding fifty cents, during the time he shall continue in such duties, in return for which sum he shall receive a renewal of his certificate.

SEC. 9. Every person claiming registration as a registered pharmacist under section 7 of this act shall, before a certificate is granted, pay to the secretary of the said board of pharmacy the sum of two dollars, and a like sum shall be paid to said secretary by graduates in pharmacy and by such licentiates of other boards who shall apply for registration under this act; and every applicant for registration by examination shall pay to the said secretary the sum of five dollars before such examination be attempted. *Provided*, that in case the applicant fails to sustain a satisfactory examination by the said board, his money, the said five dollars, shall be refunded to him.

SEC. 10. Every registered pharmacist who desires to continue the practice of his profession shall annually, during the time he shall continue such practice, on such date as the board of pharmacy may determine, pay to the secretary of said board a registration fee, the amount of which shall be fixed by the board, and which in no case shall exceed two dollars, in return for which payment he shall receive a renewal of said registration. Every certificate of registration and every renewal of such certificate shall be conspicuously exposed in the pharmacy to which it applies.

SEC. 11. The secretary of the board of pharmacy shall receive a salary, which shall be determined by said board; he shall also receive his travelling and other expenses incurred in the performance of his official duties. The other members of said board shall receive the sum of five dollars for each day actually engaged in such service, and all the legitimate and necessary expenses incurred in attending the meetings of said board. Said expenses shall be paid from the fees and penalties received by said board under the provisions of this act, and no part of the salary or other expenses of said board shall be paid out of the public treasury. All moneys received of said board in excess of said allowances and other expenses hereinbefore provided for, shall be held by the secretary of said board as a special fund for meeting the expenses of said board, said secretary giving such bonds as the said board shall from time to time direct. The said board shall, in its annual report to the Governor and to the Wisconsin Pharmaceutical Association, render an account of all moneys received and disbursed by them pursuant to this act.

Sec. 12. Any person not being or not having in his employ a registered pharmacist, within the full meaning of this act, except as provided in section 4, who shall, after the expiration of ninety days from the passage of this act, keep a pharmacy, store, or shop for retailing, compounding, or dispensing medicines, or who shall take, use, or exhibit the title of a registered pharmacist, shall, for each and every such offence, be liable to a penalty of fifty dollars. Any registered pharmacist or other person who shall permit the compounding and dispensing of prescriptions or the vending of drugs, medicines, or poisons in his store or place of business, except under the supervision of a registered pharmacist, or except by a registered assistant pharmacist, or any pharmacist or "registered assistant" who, while continuing in business, shall fail or neglect to procure his annual registration, or any person who shall wilfully make any false representation to procure registration for himself or any other person, or who shall violate any other provision of this act, shall, for each and every such offence, be liable to a penalty of fifty dollars; *provided*, that nothing in this act shall in any manner interfere with the business of any physician in regular practice, or prevent him from supplying to his patients such articles as may seem to him proper, nor with the making and vending of proprietary medicine or medicines placed in sealed packages with the name of the contents and of the pharmacist or physician by whom prepared or compounded, nor with the sale of the usual domestic remedies by retail dealers, nor with the exclusively wholesale business of any dealers except as heretofore provided.

Sec. 13. Every proprietor or conductor of a drug store shall be held responsible for the quality of all drugs, chemicals, and medicines sold or dispensed by him, except those sold in the original package of the manufacturer, and except those articles or preparations known as patent or proprietary medicines. And should such proprietor or conductor of a drug store knowingly, intentionally, and fraudulently adulterate or cause to be adulterated such drugs, chemicals, or medical preparations, he shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be liable to a penalty of not less than seventy-five dollars nor more than one hundred and fifty dollars, and his name stricken from the register.

Sec. 14. No person shall sell at retail any poisons commonly recognized as such, and especially aconite, arsenic, belladonna, biniodide of mercury, carbolic acid, chloral hydrate, chloroform, conium, corrosive sublimate, creasote, croton oil, cyanide of potassium, digitalis, hydrocyanic acid, laudanum, morphine, nux vomica, oil of bitter almonds, opium, oxalic acid, strychnine, sugar of lead, sulphate of zinc, white precipitate, red precipitate, without affixing to the box, bottle, vessel, or package containing the same, and to the wrapper or cover thereof, a label bearing the name "poison" distinctly shown, together with the name and place of business of the seller. Nor shall he deliver any of the said poisons to any person without satisfying himself that such poison is to be used for legitimate purposes; *provided*, that nothing herein contained shall apply to the dispensing of physicians' prescriptions specifying any of the poisons aforesaid. Any person failing to comply with the requirements of this section shall be deemed guilty of a misdemeanor, and shall be liable to a fine of not less than five dollars for each and every such omission.

Sec. 15. All suits for the recovery of the several penalties prescribed in this act shall be prosecuted in the name of "the people of the State of Wisconsin" in any court having jurisdiction; and it shall be the duty of the State's attorney of the county wherein such offence is committed to prosecute all persons violating the provisions of this act, upon proper complaint being made. All penalties collected under the provisions of this act shall inure, one-half to the board of pharmacy and the remainder to the school fund of the county in which the suit was prosecuted and judgment obtained.

SEC. 16. All acts or portions of acts regulating the practice of pharmacy and the sale of poisons within this State, enacted prior to the passage of this act, are hereby repealed; *provided*, nothing in this act shall be so construed as to prevent any person who has once been a registered member, and may have forfeited his membership by non-payment of dues or fees, from renewing his membership by paying the required dues or fees without examination.

SEC. 17. This act shall take effect and be in force from and after its passage and publication.

APPROVED March 24th, 1882.

REPORT OF THE COMMITTEE ON EXHIBITION.

TO THE MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

GENTLEMEN: Your committee beg leave respectfully to present as their report the following:

The exhibition was presented in the Prospect Park Pavilion, the apparently ample space of which proved insufficient to accommodate all who applied, and some of the later applications had to be refused. Whenever the building was thrown open to the public, a constant throng of visitors attested the interest and success. The effect of the gaslight upon the many colored objects was striking, and highly effective.

To fully and conscientiously perform the duties assigned this committee involves much time and labor, and requires the co-operative assistance of all its members. A statement of general application, perhaps, in regard to committee work, and a hint of some consideration to the power which constitutes committees.

Owing to the time required, and the great variety of articles presented for inspection, a general allusion only to the character of each exhibit can be made, and any omissions to notice particular features must be assignable to the neglect of the exhibitors, or their representatives, and not to that of the committee.

Your committee feel compelled to notice in this report the marked absence, of what may be aptly designated, though by homely phrase, of home-made, or shop-made preparations—galenical and pharmaceutical, *direct* from the retail shops of the country—from the rude, and meagre laboratories of the dispensers—aye, from the limited apparatus of the compounder—the more simple the appliances, the more rude the machinery, the greater and more enduring the credit. And your committee are further of the opinion that this Association should extend its encouragement in this direction, and establish a schedule of awards for competitive effort in perfecting the familiar preparations of the shop, from the simplest to the most complicated; that the Association would thus stimulate the education and ingenuity of its members, protect them against a most serious and fast-growing evil, and endeavor at least to place the business of the pharmacist once more in a position of professional independence, dignity, and good standing.

Your committee consider that in certain features these exhibitions are not without value as a means of instruction. Those who are debarred by distance and other causes from visiting the commercial centres, can derive much information by a close inspection of crude drugs, many of which in original packages are curious and interesting, as well as chemical and pharmaceutical preparations in large bulk; glassware, and sundries in tasteful display; general sundries, miscellaneous articles and novelties. That the Association should instruct its committee to visit the exhibition at stated intervals, that a time should be appointed, and faithfully kept, for an official visit of the Association in a body; this much being deemed due to the exhibitors for the labor and expense incurred by them, and as an act of simple courtesy.

A proper appreciation is due to the local secretary, Mr. Hiram E. Griffiths, of Niagara Falls, for the labor and assiduous work in the assignment of space to the various exhibitors, and to the facilities extended to members of the Association, involving constant personal attention to many petty though important details.

EXHIBITORS.

The Randolph Paper Box Company, of Richmond, Va., exhibited a very large and attractive display of paper boxes for every purpose imaginable, and of every shape conceivable, in great variety of style and ornamentation; wrapping, and powder papers, fancy boxes for powder and puffs, of highly ornate and beautiful finish.

William R. Warner & Co., of Philadelphia, a varied display of sugar-coated pills, parvules, or small pills, and granules, elixirs, effervescent salts, cachous, and specialties; all suggestive of mechanical accuracy and nicety.

Tarrant & Co., of New York, powdered drugs, refined chemicals, ethereal oils, fluid extracts, elixirs, essential oils, and Spanish Castile soap; all attractively grouped, and arranged.

Eli Lilly & Co., of Indianapolis, fluid extracts, sugar-coated pills, gelatin-coated pills, elixirs, syrups, etc. The gelatinous coating of the Messrs. Lilly & Co.'s pills present no pin-perforations.

Bullock & Crenshaw, of Philadelphia, a large assortment of sugar-coated pills, elixirs, fluid extracts, neatly arranged for view and inspection, presenting evidences of skill and care in manufacture.

John M. Maris & Co., of Philadelphia, a well-presented assortment of cologne bottles, shelf bottles, window furniture of latest design and fashion; mortars, graduates, patch boxes, twines spooled and reeled, vari-colored, of linen surface finish; adjustable pill roller and retainer, and glassware in great variety.

Mellor & Rittenhouse, of Philadelphia, extract of licorice in mass, stick, and in lozenges; powdered extract of licorice, licorice root, and ammoniated glycyrrhizin, a substance said to materially obtund the bitterness of quinine. The licorice extract assumes an additional interest in being a comparatively new branch of American industry, being made from the root as imported.

Hance, Bros. & White, of Philadelphia, pharmaceutical preparations, fluid extracts, sugar-coated pills, absorbent cotton, powdered drugs, powdered extracts, fruit juices, and, as a mechanical adjunct, Hance's drug-mill—the manufactured products giving token of standard quality throughout.

Messrs. Theo. Ricksecker, of New York, exhibited a line of fancy goods, druggist's sundries, toilet articles, and specialties, among the latter Ricksecker's skin soap.

The Albany Chemical Co., of Albany, New York, exhibited fine elixirs, fluid extracts, concentrated spirit of nitre, and many other preparations.

P. J. McElroy, of East Cambridge, Mass., glass syringes, Geyer's nipple-shields and breast-pumps (sensible and practical instruments), syringes in cases; these instruments have a piston-packing asbestos fibre, which while fitting closely is non-absorbent, and would appear to present an important advantage.

H. Sugden Evans & Co., acid syrups, different flavors, with a basis of lime juice; lime fruit juice tablets, and Montserrat lime fruit juice cordial.

N. Rosenwasser, of Cleveland, Ohio, percolating apparatus. In the construction of this instrument the inventor claims greater mechanical perfection and utility than is to be found in the ordinary forms of similar apparatus.

John Matthews, of New York, soda-water apparatus of most elegant design and finish; in the general effect and ornamentation, skill, taste, and workmanship would seem to have reached the highest attainment. Generators were also exhibited as well as glass siphons, syrup containers of glass, constructed with a view to the avoidance of metallic contact; fruit juices, flavoring essences for syrups, and a draft stand of unique construction for medicinal mineral waters.

B. O. & G. C. Wilson, of Boston, pressed and loose herbs, barks, roots, flowers, leaves, powdered drugs, fluid extracts, etc.

Young, Ladd & Coffin, of New York, manufacturers and proprietors of Lundborg's perfumery; odors in great variety, odor caskets of beautiful finish, handkerchief extracts, toilet perfumes, particularly observable in their diversity as well as most attractive in their elegance and quality.

Powers & Weightman, of Philadelphia, a rare and costly display of chemicals, alkaloids, pharmaceutical preparations, and natural products, a distinguishing feature of the general exhibit; the artistic grouping of the articles, the pleasing effect of contrast, the huge masses of crystals, showing the wonderful play of physical law, all arranged with a view to convenience for observation, attracted the attention of visitors as well as members of the Association, and created most favorable impression.

The Burroughs Bros. Manufacturing Co., of Baltimore, a very full assortment of fluid extracts, and medicinal fluid extracts, prepared from some of the most recently introduced vegetable substances.

Henry Trœmner, of Philadelphia, variety of scales, analytical, prescription, and counter, of particularly fine finish, wonderfully accurate mechanical construction and adjustment, also metrical and troy weights.

Indexical Soap Co., of Boston (Robinson, Bros. & Co.), toilet, medicinal, and shaving soaps, pressed and moulded with mechanical nicety, richly perfumed and handsomely wrapped.

Gustavus Pile, Philadelphia, thermometers, Baumé hydrometers, specific gravity bottles, pipettes, graduates, dilatometers, and graduated bottles and tubes; chemical thermometers, hydrometer jars, urinometers, aluminium weights in the metric system, phosphoretted resin, and prepared chalk.

McIntyre & Embury, New York, chemicals, resinoids and fluid extracts. This house also exhibited a line of dialyzates, among them such familiar substances as ergot, together with nux vomica, aconite, veratrum, and other alkaloidal substances.

Lazell, Marsh & Gardiner, odors in bulk, cases, caskets, and stands; sachet powders, smelling salts, cologne (Atwood's), powder puffs, Florida water; these goods were displayed in a handsome case or stand, elegant in dimensions, and tasteful in arrangement, with great effect.

J. W. Campion & Co., Philadelphia, distilled bay rum or spirit, from St. Thomas, W. I., manufactured by A. H. Riise. This article has received some high encomiums. It possesses a distinctive, delicate, and permanent odor, in strongly marked contrast with the ordinary artificially manufactured articles of commerce.

C. B. Lochman, Bethlehem, Pa., photographs, in great variety, of medicinal plants; showing distinctive formation of leaves, fruits, and medicinal parts; of manifest usefulness to the student. Also, Loehman's Book of Doses and Price labels; affording useful means of reference.

A collection of quaint old drug-bills (exhibitor unknown), itemized and dated August 16th, 1766, June 18th, 1769, and October 14th, 1783. In design and rates very curious. Also an oddly worded advertisement of ancient date, of drugs and groceries for sale by Samuel Whiting, next door to the court-house, Great Barrington, Mass. Also, on same sheet, advertisement of Abram K. Whiting, of a "moderate retail stock of medicines," the attention of physicians being called in the following language, which, by the way, might have a significance at the present day: "Where gentlemen of the Faculty, who favour him with their recipes, may depend upon having *justice* done their prescriptions." This was printed in New York, in 1783.

Thorp & Lloyd Brothers, of Cincinnati, a most extensive and liberal display of resinoids and active principles, conspicuous among them being large bulk of podophyllin, hydrastine, and leptandrin, crude and purified, muriate, salicylate, and sulphate of hydrastine, and a specimen of nitrate of sanguinarine, of a peculiarly bright and odd color.

Seabury & Johnson, New York, a very full and complete display of special manufactures. Absorbent lint, plain and medicated; absorbent cotton-plasters, in endless variety, all well known and familiar to the trade.

John Wyeth & Bro., Philadelphia, fluid extracts, compressed pills, select drugs, Lawton's absorbent cotton, elixirs, hypodermic pellets, Bishop's effervescent salts, and Marvin's cod-liver oil.

Smith, Kline & Co., Philadelphia, elixirs, concentrated liquors, extracts, pepsin, ergot, and other medicinal substances, cylindric lozenge-roller, and adjustable pill machine.

Hiram E. Griffith, Niagara Falls, flavoring extracts, emulsion cod-liver oil, camphor ice, elixirs, writing and copying inks, etc.

Loeb & Bro., 604 Broadway, New York, toilet cases, medicine chests, neat and tasteful in proportion and design, from moderate to expensive in price. Also fancy goods for holiday sales.

Mallinckrodt Chemical Works, St. Louis, Mo. Specimen of carbolic acid, bottled in 1875, showing no discoloration, notwithstanding continued exposure to light. (NOTE.—This house had arranged for a large display of manufactured products, but were so unfortunate as to have their goods delayed in transit. They manufacture a line of chemicals for medicinal, photographic, and technical purposes.)

W. H. Schieffelin & Co., New York. The gentlemen in charge, Messrs. Gellatly, Buehler, and Parsons, were favored in the location of their exhibit, and used the advantage with commendable taste and skill in the arrangement of the various articles, presenting a large, costly, and instructive display of rare and familiar drugs, many in original packages. Among these may be instanced a quaint can of oil of cajeput, a horn of civet, and an odd-shaped flask of oil of rose. Nineteen different specimens of cinchona barks were shown; also, thirteen samples of assayed opium, representing eight varieties of commercial opium; a variety of costly sponges; eighteen different varieties of essential oils; Norwegian cod-liver oil; gourd of Barbadoes aloes; package marbleized gum benzoin; bisulphate quinia; the oleates zinc, and other oleates,—the whole presenting the most varied collection of medicinal substances shown at this exhibition. Among the objects of trade and personal interest were a number of medals of award and certificates, handsomely framed and mounted.

McKesson & Robbins, New York. This house was debarred from using space in the pavilion, by reason of its insufficiency. Their exhibit was arranged in a store-room, opposite the hotels, and consisted of a very handsome display of fine imported fancy goods, including every conceivable want and novelty, in toilet and fancy articles, in lacquer, bronze, and wood-work boxes, dressing-cases, and necessaries for the toilet. This house prefers to alternate the character of their displays, in order to show the variety of goods in which they traffic.

Fairchild, Brothers & Foster, New York. Pepsin in scales, essence pepsin, extract pancreatin, elixirs, and pharmaceutists' preparations.

Young & Smylie, Brooklyn. Licorice extract in stick, licorice confections, and Acme licorice pellets, a little ovoid lozenge of licorice, of uniform and convenient size, as a troche. These preparations are made from the imported root of licorice, and give evidence of absolute purity.

Anglo-Swiss Food Company. A large display of condensed milk and milk food, in cans and packages.

Colgate & Co., New York. A full line of extracts, toilet waters, soaps, and vaseline preparations, of well-known quality; also the more recent products in wrapped soaps, as the "Rosadora," "Opoponax," "Naides," etc. Also, Cushman bouquet extract, and violet toilet water.

Rosengarten & Sons, Philadelphia. A creditable display of fine chemicals, crystalline salts of morphia, quinia, and cinchonidia, lime benzoate, soda tartrate, lime hypophosphite, and potassii sulpho-carbolas, bismuth subnitrate, and others, all regular and uniform products of this well-known establishment.

Charles C. Wells, Saratoga, exhibited what is called, from its semblance, "The Porcupine Pill-coating Machine," a revolving cylinder, with needle projections from its surface for holding, dipping, and drying pills, after passing them through a bath of solution of gelatin. This machine is for use at the dispensing counter, for the instant and extemporaneous coating of pills, and seems to be well adapted for the accomplishment of that purpose.

Smith & Painter, Wilmington, Delaware. Carboy trunnion, a convenient arrangement to facilitate the emptying of carboys; also, fruit juices, flavoring extracts, and liquid rennet.

G. J. McKelway, Philadelphia. Hubbell's Prepared Wheat, elixir valerianate of ammonia, bitter wine of iron, elixir cinchona, ferrated elixir of bark, sodium ethylate, suppositories, and cod-liver oil emulsion.

Dean, Foster & Co., Boston. Glassware, window and show bottles, cologne and odor bottles, prescription vials, and a very handsome display of pungents.

T. W. Heineman, Chicago. A full line of isinglass; corn and bunion plasters; waterproof court plaster, on satin and silk; same material, spread on gun-cotton film, prepared for the purpose; mustard plasters, dispensary bandages, and shoulder-braces, chest protectors. All put up in forms well adapted for retail sales.

Roehr & Hunke, Chicago, Agents Transatlantic Supply Company. Glazed paper boxes, gallipots, capped bottles, and pill finishers, cachets, bottle-capping papers, labels, distillatory apparatus, scales, wine and cologne labels.

Paas Dye Company, Newark, New Jersey. Specimens of dyed eggs, with colors for same; also, dyes for woollen and cotton fabrics.

A. M. Knowlson, 350 Broadway, New York. Suppository moulding machine.

C. T. Williamson, Newark, New Jersey. Combined dose cup, corkscrew and handle wire; and nickel-plated corkscrews in great variety.

Gilliams & Son, Philadelphia. Decorative paper tops for corks; the Acme poison guard, a little device of ball and chain, for attaching to neck of bottles containing poisons.

The Erie Show Case Company. Novel styles of sectional show cases, for the full and easy display of goods; adapted to use of merchants, druggists, etc.

George Blair & Son, Corry, Pa., Agents for Messrs. Clark & Warren, manufacturers of a new product from coal-oil called "petrolatum."

Eugene Rimmel, London, Paris, and New York. Handsome assortment of handkerchief extracts, toilet articles, specialties, and numerous notions in perfumery.

(Signed) WILLIAM B. THOMPSON,
GEORGE EGER,
JAMES W. CALDWELL,
T. J. CASPER,
THEO. SCHUMANN,
Committee.

SPECIAL REPORTS AND ESSAYS.

I. PHARMACY.

PRECIPITATES IN FLUID EXTRACTS.*

BY J. U. LLOYD, CINCINNATI.

In considering the formation of precipitates or sediments in fluid extracts and tinctures, I have previously presented a line of experiments to show that, to a greater or less extent, they result from the mixing of various solutions, whereby a new solvent is formed, and which is incapable of retaining in solution the matters extracted from the crude material by each section of the original percolate, hence a line of precipitates. As this act of precipitation progresses, the solvent power of the menstruum changes, in consequence of deposition of material which formed a part of the previous liquid; therefore the deposition of one precipitate led to the formation of others. If this phase alone were to be considered, after a certain length of time varying perhaps from months to years, the menstruum would arrive at a point where it could hold in solution all of the material then dissolved, and at this point the act of precipitation would cease. This view of the case must be accepted, even if we assume that none of the constituents in solution are soluble after purification in the original menstruum; for, after a certain time under such conditions, a pure menstruum would remain, and all of the dissolved matter would have settled to the bottom of the vessel.

Now we know that this point is never reached. Fluid extracts and tinctures often precipitate to a very great extent, and sometimes become much lighter in color, but never reach a point where all of the dissolved matters become insoluble. Upon the other hand, under ordinary conditions, changes usually follow as long as we may keep a specimen of fluid extract, and the result of these changes is a continuous precipitation. In taking up this phase of the subject, it may seem that the two preceding statements contradict each other. However, such is not the case, for continuous precipitation may be taking place without depleting the liquid of dissolved matters, and may continue for an indefinite period. Let me introduce the proposition with the following experiment, which, although apparently foreign to our subject, will illustrate the phenomena which follow with the tinctures and fluid extracts upon our shelves.

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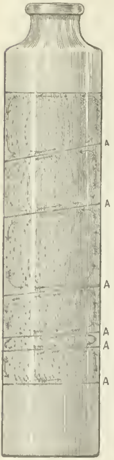
* Read at the Fourth Session.

Into a glass vial from six to twelve inches in length and an inch in diameter, pour distilled water until it is half filled, then finish filling the tube with simple syrup. The mixture at first will not be transparent, owing to the different refractive power of the mixture of liquids; after a time, however, the liquid appears homogeneous and transparent, and is apparently uniform, a diluted syrup. Place the tube near a warm stove or hang it against a hot steam pipe, and in a few moments the liquid will have divided into several sections by what appears to be sharp planes.* These planes of division resemble the plane which divides a layer of chloroform from a layer of water, and are fully as sharply defined, but the refraction of light from the surfaces of the upper and lower liquids is not as great. To observe the lines of division most readily, place the eye on a level with the tube, and gradually raise or lower the head so as to bring the edges of the planes one after another before the eye, when sharp distinct lines will appear. If the eye be just above or just below the edge of the plane, a reflection from its surface will become apparent, and which resembles the afore-named reflection from the contact surfaces of chloroform and water. These divisions remain for some time, often for days, dependent upon the diameter and length of the tube, difference in gravity and viscosity of the liquids, and the heat to which the tube is subjected.†

Fig. 65.



By referring to the accompanying figure the phenomena will be found illustrated exactly as presented to the eye of the artist, who made the drawing from a vial that had been heated a few moments. The heat was applied along the side marked A, and the letters show the lines of division.

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* It might naturally be supposed that when the heat is applied to one side of the length of a tube under the conditions named, one upward current of fluid would result along the entire side next to the heat. If this were the case, in a few moments the entire contents of the tube would be a uniform mixture. Such is not the result, however, and in consequence much time is necessary to effect this end. On a larger scale, but following the same principle, we have oceanic and atmospheric currents, giving us the Gulf Stream and the strata (clouds) of condensed or precipitated vapor between the moving currents of air.

† By viscosity of liquids I refer to those that have little diffusive power, and which are known to form ropy and sticky solutions. Thus, under the same conditions, a heavy solution of potassium bromide will disappear much sooner than a solution even of less gravity of gum or glucose.

Let us examine more closely the contents of the tube while heat is being applied, and during which the planes to which I have referred are distinct. If the solutions are transparent and the heat regular, the observer will not be able to detect a trace of motion. The lines which are the edges of the planes of demarcation will steadily hold their position as though fixed on the glass, and the liquid between the lines will appear to be at rest. These conclusions are erroneous, however, for the planes are gradually shifting their positions, and from time to time will severally disappear, to be succeeded by others, and the liquid within the tube is in rapid motion.

If the experimenter will scatter over the surface of the liquid a few particles of some finely divided powder, which is insoluble in the liquid, each particle will settle with a steady motion until it strikes the upper plane, where the downward motion will experience more or less of a check, as though it had struck some obstruction; then it will pass through the second section of liquid with decreased velocity. Upon reaching the second dividing plane another arrest in the velocity of the downward motion will be experienced, and the particles will afterward settle more slowly. This experience will be repeated with each plane and each section of the solution until the fall of the powder ceases. Now it will be found that each plane or section of liquid will have arrested certain portions of the powder. This distribution is in accordance with the gravity of the different particles of which the powder is composed; those of less density being first arrested, and others in accordance with their weight falling until they reach a section of solution, or a plane, of their own specific gravity, and such particles as have a greater gravity than the lower stratum of solution will have reached the bottom of the tube.

Let us now consider the composition of this solution, and the changes which gave rise to the formation of these planes of division and intervening sections of liquid, each of different specific gravity.* When we poured the syrup into the water, by reason of its greater gravity a portion of it settled to the bottom and formed a layer of syrup. Other portions became more or less mixed with water, and in accordance with the gravity of each mixture, arranged themselves over the syrup. This selection of position continued, the upper portion of the tube containing nearly pure water. In a short time the act of diffusion had blended the points of contact between the various solutions, giving to the contents of the tube the appearance of a homogeneous liquid. When heat was applied to one side of the tube, expansion of the liquid next to that side resulted. Each portion of the liquid next the heated side of the tube started upward, but excepting more or less of the top of the liquid, each heavy layer quickly reached a lighter overlying stratum, through which, by reason of its greater gravity, it could not ascend. Hence at intervals the top of each stratum of this current ceased to rise, but owing to the upward pressure of the current beneath, it was crowded away from the side of the tube and into the cool solution beyond. The deficiency occasioned by this upward current was supplied from the lower part of each section of liquid, and quickly we had a circulation of liquid. Each of these eddies continued to increase in a horizontal direction, but remained bounded by nearly the same planes above and below. Finally the entire tube was filled with eddies, each of less specific gravity than the one below.

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* I have as yet simply made the statement that these sections are composed of different solutions, and have brought no proof to demonstrate the fact. This is self-evident, however, although it is but just for me to say that these sections have been examined severally at different times, and invariably there is an increase of solid matter in solution as we progress from the surface downward. The following example illustrates this fact, a tube containing a dense solution of sodium chloride overlaid by distilled water having been submitted to a one-sided heat until it had formed five zones. Upon removing one c.c. from each zone, the proportion of sodium chloride was as follows:

No. 1 (top), 0.24 gr.; No. 2, 0.73 gr.; No. 3, 2.37 grs.; No. 4, 3.97 grs.; No. 5, 4.44 grs.

When we dropped the powder on the surface of the liquid within the tube, each particle descended in the manner before explained, until it reached a section of solution nearly of its own specific gravity, where its fall was arrested. Not so the motion, however, for each particle of powder circulated with the liquid within which it was retained, thus showing us exactly the movement of each section of solution within the tube.* This movement will continue while heat is being applied, or until the entire liquid within the tube is of the same composition, and then the solution as one body will circulate from the bottom to the top of the tube.

The experiment which I have described, and which all can verify easily, is typical of the motion which always results when heat is applied to liquids of different specific gravities, if they are capable of forming a solution one with another. A variety of movements may be obtained by varying the position of the body which imparts the heat, but such variations simply result from modification of manipulation. It matters little whether the heat be applied evenly to all parts of the vessel, to the bottom, or to other sections, circulation follows, and the result is finally a uniform mixture of the liquids.*

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* I speak now of a rapidly circulating solution and a precipitate near its own gravity. If the section is moving slowly and the precipitate heavy, the particles of powder will either rest upon the plane of division, or, seeking the side of the vial next the heat, in obedience to the motion of the lower part of the stratum, will adhere to the glass.

If a tincture or a fluid extract be made by percolation and the percolate be received in the order obtained, there will be a decrease in gravity from the bottom of the container upward. This is in consequence of the well-known fact that the denser part of the percolate passes first, and that the percolate grows less dense with more or less regularity as percolation progresses. When such a percolate is permitted to stand, it will resolve itself into strata, and the liquids will mix in a manner similar to those in the experiment we have cited. The phenomenon is not so readily observed in these instances, owing to the fact that most percolates are dark in color and will not permit the passage of light, but the collection of strata of precipitates at one or more points throughout such liquids indicates where the lines of division are to be found, and it is for the purpose of introducing these precipitates understandingly that I have briefly directed attention to the experiment with the tube of liquid, and I will now return to a more minute analysis of the changes which occur.

Under the conditions we have named it has been shown that each solution rested upon one more dense, and where the liquids are in contact we have motion in opposite directions. The surfaces of each of these liquids appear to be in direct contact and to move as though pressing against a solid plane, which is the line of division between them. If we magnify this apparent line it will be found of considerable thickness, and in reality to consist of a stratum of fluid almost at rest as compared with the rapid flow of the upper and lower strata. However, it is in a state of excitement occasioned by the friction of the two opposing solutions, and is eddying and struggling as it is tormented by these contrary agents. It will be further found that portions of the upper side of this thin stratum are being constantly torn off and carried mechanically into the upper liquid; and this is true also of the lower side and the lower liquid. As the stratum is made up of a mixture of these two revolving bodies, and its existence depends upon an admixture of these liquids, it follows that whenever a portion of the stratum is detached and carried into one liquid, the result is an admixture with it of a portion of the other liquid. Inasmuch as these admixtures are constantly taking place while the circulation of the liquids continues, it follows that there is a continual handing down of the upper revolving liquid and a handing upward of the lower. When we consider that the foregoing example is a simile of changes that are taking place throughout the entire tube with each of the other sections, we must see that, at some time, the liquid at the bottom and the liquid at the top of the tube will have become identical in composition. We can also see that this interchange is independent of the act of diffusion, and can only be considered a result of mechanical action, the primary agent being heat. Now if we have a liquid at the top of the tube differing from that at the bottom to such an extent that when these liquids are mixed precipitation results, it follows that wherever the liquids are interchanging in the proper manner precipitation must follow at that point.* Hence it is that I have called attention to the foregoing argument and experiments as a means of illustrating a fact connected with precipitates in tinctures and fluid extracts, which, perhaps, has not presented itself to many of us, but which will be often noticed after attention has been called to the matter.

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* During the past six years I have carried on a series of experiments regarding this motion of fluids, but the example I have given is all that is necessary for the subject now under consideration.

After a precipitate has formed in a tincture or a fluid extract it is generally accepted as permanent. All will admit that precipitates often continue to deposit for months and even years, but I cannot find it recorded that they disappear. It is true, however, that a line of precipitates may form and then decrease in size only to form and waste away again. This growth and reduction is readily understood when we consider the cause of their production, and to do this I beg leave to refer to my last communication on this subject (Proceedings for 1881). I there called attention to the fact that a percolate was a mixture of solutions, and that continuous precipitation resulted after the percolate was mixed, from inability of the mixture to dissolve substances which were perfectly soluble in the fractions of the percolate at various stages of its production. From this reason I argued that, with ordinary hydro-alcoholic menstruums, we could not expect a line of permanent fluid extracts. This explanation, however, is insufficient to carry the production of precipitates beyond certain moderate periods, and we know from experience that the act of precipitation may continue indefinitely, independent of evaporation of menstruum. It has never been stated, that I can find, in connection with this point, that, at intervals, the precipitate, to a greater or less extent, will dissolve, yet such is the case. Were it otherwise, a point would be reached when all of the dissolved matter would be thrown from solution, and, consequently, no further deposition could occur.

To illustrate how precipitates may increase and decrease, let us suppose that a fluid extract of senna has remained in an even temperature until an equilibrium has resulted and the menstruum is capable of holding in solution every particle of the dissolved matters which remain above the sediment; perfect rest will now result and precipitation cease. A change in solvent power of the solution must take place before further precipitation can follow, and a change in temperature will be followed by either decreased or increased solvent power, and consequently by more or less precipitation or resolution of the precipitate.

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* This may be nicely illustrated by introducing, at the bottom of the tube, a pellet containing a decided trace of potassium ferrocyanide, and dropping on the top of the liquid a little solution of a ferric salt. The formation of a blue precipitate in some intermediate stratum shows where the two come together.

Let us accept the former, that there is a decrease of temperature after a precipitate has ceased to form under a constant temperature. Another precipitate will result which is entirely different from the former, and this precipitate can to the greater extent redissolve in the menstruum when the temperature increases. This precipitate, during the low temperature, settles to the bottom of the bottle, and, upon an increase of temperature, redissolves, giving us a dense layer of solution upon the bottom of the bottle. The solvent properties of this layer of solution differs from the liquid above, and, as a consequence, certain portions of the precipitate previously cast down will dissolve. This dense warm liquid acts upon other constituents of the precipitate, and, as these dissolve, the solvent power of the solution changes and other portions of the precipitate dissolve until, finally, a considerable amount of the precipitate has disappeared. During this time circulation of the liquid has formed perhaps more than one stratum at the bottom of the container, and then, by the circulation I have exemplified in my previous experiments, there is a starting upward of this lower solution and a downward motion of the upper. Finally, a condition will be reached in some portion of the liquid where, by the intermingling of the lower and the upper solutions, certain principles that were dissolved from the precipitate will become insoluble. This state is usually indicated by a cloudiness at the point of contact of two stratums, and the result is the formation of a precipitate. This precipitate will continue to form until the composition of the liquid within the container is again uniform and the strata have disappeared. Such a final state of affairs can only be reached under an unchanged temperature, and we know that under ordinary circumstances an even temperature for any length of time is impracticable. As a consequence, we may expect to have more or less of strata in our containers, and repeated precipitation and resolution. Our precipitates will come and go with the changes of temperature, and there can be no rest. Thus is explained, as I stated at the commencement of this article, how continuous precipitation may be taking place without depleting the liquid of dissolved matters, and may continue for an indefinite period."

There is some difficulty in accurately studying the above-named phenomena, unless the experimenter will select some article that will yield much extractive and little coloring-matter but all who have observed the action of fluid extracts and examined their precipitates at different stages will recall many instances where the foregoing description of phenomena can be applied. In connection with this subject I shall now introduce the notes of an experiment which illustrates the formation of a precipitate by the gradual admixture of different portions of a transparent percolate, and which will show us the workings of the strata currents under ordinary conditions.

May 5th, 1881. Eight troy ounces of powdered capsicum were properly moistened with dilute alcohol and packed in a cylindrical percolator. The receiving vessel was an ordinary two-gallon salt mouth-bottle. Into the mouth of this the percolator was inserted, and to the exit of the percolator a rubber tube was attached. This tube extended to the bottom of the bottle, and the lower end of it was fixed to a cork, so that as percolation progressed, the floating cork would hold the exit of the tube at the surface of the liquid. By this arrangement the percolate was collected in the order obtained and without mixing, the lightest liquid being on top.

Description of Percolate.—The percolate passed transparent from the beginning until the end of the act of percolation. The lower portion of the liquid was dark red in thin section, black as viewed in bulk. From the upper part of this dark layer, the color became gradually less and less in shade, until it passed to a light straw-color. This point was reached at a height of 4 inches above the dark layer; the remainder of the container (6 inches) was of a uniform light straw-color, and doubtless would have remained so had the act of percolation been continued for days. This percolate consisted then of three parts, a lower solution rich in dissolved matters, a central solution where there was a marked and rapid decrease in color from below upward, and an upper liquid of uniform color, the proportion being as 3, 4, and 6. Undoubtedly the bottom of the lower section was most concentrated, although the color of the first three inches of solution was so deep as to forbid a comparison by the color test. However, the entire percolate had two points of distinct division, one where the color rapidly decreased from dark red to light red, and the other where the change was rapid from light red to yellow.

Changes.—The container, closely stoppered, was retained in the laboratory in the position where the act of percolation was accomplished. In two hours from the time of the cessation of percolation a muddy layer of liquid appeared between the dark-red (lower) and light-red (overlying) solutions. In four hours the entire light-red percolate was muddy, in six hours it had resolved itself into three sections, each with distinct lines of demarcation. After twenty-four hours particles of yellow precipitate appeared abundantly in the upper of these sections and gradually settled to the surface of the second section; here there was a retardation of the motion of the particles and a diminution in the amount of precipitate, but finally it collected in large particles and fell through the second dividing plane. As the precipitate passed through this second section it decreased, and finally entered the heavy dark lower liquid, *where it entirely dissolved*. After seven days the three central strata had resolved into two sections and had become transparent, throughout which were clots of precipitates. The upper portion of the liquid in the bottle was very muddy and gave rise to a constant rain of precipitates, that gradually settled through the lower strata, dissolving as they passed, until only a very small amount reached the bottom of the bottle. These appearances were maintained for ninety days, at which time the liquid in the bottle had become transparent, and of one color and composition; the strata and lines of demarcation had disappeared, a uniform yellow precipitate covered the bottom of the bottle, and a layer of oil-globules overspread the surface of the liquid.

Analysis of Phenomena.—The examination we have given the changes which occurred in the tube, makes this example simple and readily understood. The percolate from the capsicum formed a liquid in the bottle that was concentrated at the bottom, and which became dilute with more or less regularity as we passed towards the surface. This association of different liquids under the influence of change of temperature resulted in the formation of strata, and each stratum was circulating upon the principle of those of our tube, excepting that as the temperature changed regularly over the surface of the entire cylinder, the circulation was from the outside of each section towards the centre of the bottle. This circulation even without the aid of diffusion gradually transferred the various portions of the liquid, effecting an even mixture.

Cause of Precipitation.—By referring to our article in the Proceedings of this Society for 1881, it will be found that when different portions of ordinary percolates are mixed, precipitation is likely to result. Now, the precipitate under present consideration followed from the usual cause, a mixing of percolates. The concentrated solution at the bottom of the bottle was gradually transferred to the dilute solution above, and *vice versa*. This caused a precipitation of substances insoluble in the new solvents, and as the greatest change or strain results from the rapid dilution of the heavy solution, precipitation was most rapid at intermediate parts, or the upper portion of the liquid.

Resolution of the Precipitate.—It will be noticed that after the precipitate was formed in the upper part of the liquid, it disappeared as it progressed towards the bottom of the bottle. This resolution resulted from the fact that the lower strata were solvents for bodies that the upper could not hold in solution. Hence the gradual formation of the precipitate in the upper part of the bottle was followed by the resolution of the larger part as it slowly settled towards the bottom. Indeed, after seven days had passed, these aggregations of precipitate in the third stratum were in pieces as large as the first joint of the little finger, but these for a long time were almost entirely dissolved in their passage through the underlying strata, only reaching into the top of the lower liquid. It must be remembered that the lower solution gradually became more dilute, and that finally its solvent action was so decreased as to permit more or less of the precipitate to reach the bottom of the container.

The points I desire to present in this paper as a step further in our study of fluid extracts may be summed up as follows:

We cannot hope to produce by percolation a line of permanent fluid extracts or tinctures, for most percolates will precipitate more or less owing to aforementioned causes, even without a change in temperature. Theoretically, this precipitation, if we could maintain an unchangeable temperature, would continue until an equilibrium was established, and then the liquid could hold in solution all the dissolved principles. However, an unchangeable temperature is not practical under ordinary circumstances, hence it follows that occasionally the sediment is increased by a precipitation which results simply from low temperature. This precipitate will redissolve when the temperature increases, the solution formed may act upon and dissolve more or less of the precipitate already present, and this stratum of liquid by diffusion and circulation will reach the upper portions of the container, to be altered in composition and precipitate again. Thus we find that from natural causes precipitation in fluid extracts made by percolation may continue indefinitely, and that these precipitates may periodically continue to increase or decrease, and that there is little chance for absolute rest. It follows also that even though we may prepare a fluid extract with great care, and shake the same until it is a uniform mixture, after a period it may be very different at the top and bottom of a container. This is explained by the fact that after a decrease of temperature a precipitate is formed, then an increase of temperature redissolves it, giving a lower stratum of liquid, perhaps *very* rich in some proximate principle.

There are other phases connected with this subject, and, from the manner in which my last article to the Society was received by pharmacists and manufacturers of pharmaceuticals, I am led to believe they would prove very interesting, but to consider them at this time would lengthen the paper, and perhaps make it wearisome.

A STUDY OF PERCOLATION.*

BY NATHAN ROSENWASSER, CLEVELAND, OHIO.

"Nothing new under the sun," is an old proverb, and, in a limited sense, this is true.

Man toils, plans and improves constantly upon the known, discovers new laws of nature, tears down old theories and builds others again, only to be told that what *he* has done is not new; that he has created no new force and no new matter; that he has in his greatest inventions *simply applied* laws that have been known since the time of man, co-existent with matter. Grudgingly the world rewards him for his zeal, and grudgingly she bestows her thanks.

True it is man cannot create, but he can *arrange* the pages of nature's book, so that the novice in the study of her works will not stand in bewilderment, without a key to her alphabet, seeking for something but not knowing which leaf to turn to.

Here it is science and art come hand in hand; they present him with a key to the alphabet of nature, arrange the pages of her book, and open his eyes to a view of nature's simple ways and the methods of their application.

We find it is, *after all*, to science we must look for a key to the *order* in nature, to art for the means of applying her treasures to the uses of man.

But science, as the *art* of simplicity, owes its existence to the *human mind*, and it is, therefore, not unjustly that man demands the tribute of honor the world so unwillingly yields. The mysteries of nature in every form and shape are closed to all senses, save to the subtle power of the human mind. The invasion into her territories has been going on for ages, "with worlds still left to conquer."

Pharmacy has had her proud name enrolled for many years among the foremost of these conquerors, and her banners now float o'er many a fort that was for years considered impregnable.

Proud of the names of the heroes of her victories, they are deservedly associated with the history of their achievements, and will be handed down through time with the record of their works. Around the walls of a fort that does not easily surrender the army of progress is fighting. Pharmacy has been called to the assault repeatedly, and not in vain. Constantly gaining ground, she has yet many a trench to dig and many a height to climb ere she can reach the citadel and add to her list of conquests the proud name of Percolation.

Let us once more prepare for the assault and with all the art we possess and with simplicity, the truest guide of science, study to master percolation.

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* Read at the Third Session.

To pharmacy, percolation has for its object, *the obtaining from medicinal solid substances a solution of their medicinal constituents.*

Whatever other process may be used for accomplishing the *same* or *similar results*, all must acknowledge that this is the *only* object sought to be accomplished in percolation.

When to apply this process and how to apply it, can only be learned through a careful study of the results sought for, the condition of the matter to be treated, and a comparison of methods for accomplishing the result.

As previously stated, the prime object of percolation is solution. A study of the laws that govern solution, with a view to a knowledge of *how to bring about the most favorable conditions* and how to avoid the difficulties and obstacles that arise in pursuance of our object, a study such as this cannot be otherwise than necessary before we can attempt to enter upon a discussion of merits or demerits of one method over another.

Let us, then, enter upon a study of solution, having this object in view,—to know something about it, in the relation it bears to what we are desiring to master.

It is claimed that it is almost impossible to study anatomy properly without a subject, and perhaps without some examples and experiment it would be equally as difficult to study solution.

I place before you six vessels of equal size and weight. Into No. 1, I am about to place a cubic inch of water and a cubic inch of salt in one entire crystal cube. Into No. 2, I will also place the cubic inch of water, but before I add a similar cubic inch of salt I will reduce it to an impalpable powder. Into No. 3, I will place again a cubic inch of water, and before adding a similar cube of salt, reduced as before to an impalpable powder, I add a third of a cubic inch of salt powder and dissolve it, adding the entire powder of the one cubic inch of salt afterward. Into No. 4, I place again a cubic inch of water and another cubic inch of salt evenly divided into 16 smaller cubes. Into No. 5, I place a cubic inch of saturated solution of salt and also a cubic inch of salt crystal, reduced to fine powder. Lastly, I place a cubic inch of water into No. 6 and pour a cubic inch of oil over it.

Let us look at these various vessels and observe the actions that take place as we proceed.

No. 1. The instant we place the crystal of salt into the water we have our attention called to two very distinct substances. The one is the crystal, clear, distinct, definable in bulk, in taste, in shape, weight, etc.; the other, the water, also clear, distinct, of definite weight, bulk, taste, limpidity and other physical properties. *In the very same in-*

stant our attention is called to a change. The water that touches the crystal loses identity; it is heavier, it is denser, it occupies more space than it formerly did. it is distinct in taste, refractive power, and many other properties. Changed also. we observe, is the salt; it weighs less and occupies less bulk. Nor has the change ended here; the bulk of the whole mass as a unit is altered. We have now *less* than two cubic inches of matter. We measure the temperature of the water, and that too has changed! What has happened?

Applying our observing faculties more acutely we notice that at the surfaces of contact between the water and the crystal, these two substances lose their power of remaining distinct, the one as a limpid, tasteless liquid, and the other as a solid, but that by a newly manifested force, which we name *solution*, the attractive forces that had until now retained each as distinct, are in one instant counteracted and overcome; the solid no longer coheres to the rest of the salt. the liquid has disappeared from the balance of the water; a definite amount of salt and water have disappeared.

Where is the lost salt and water?

Co-existent with the loss of this much matter, *a new and distinctive body is noticed*, denser than the pure water above it, not opaque and solid, but fluid in form, with properties that recognize it as distinct from either in many things.

An examination reveals to us this new body as comprised entirely of and containing *all* the lost salt and water.

As a definite body, we name this new body "a saturated solution of salt."

We started out with two bodies, distinct and definable, and we obtain as the result of the work of one instant, three—water, salt, and saturated solution.

We proceed to vessel No. 2. To its cubic inch of water we add the cubic inch of salt, which is previously reduced to an impalpable powder. We stir it into the liquid, so as, in one instant, to cause each molecule of salt to be completely surrounded by contact with the water. Observe.—instantly a great part of the powder has dissolved away,—all the water has been lost to identity,—the liquid increased in bulk,—the bulk of the whole as a unit reduced; for no matter how many of such successive moments we may keep on stirring, no more solid will dissolve, nor will the quantity of fluid be augmented. A certain amount of powder will settle down to the bottom of the vessel.

Proceeding to No. 3, we dissolve in the cubic inch of water one-third of a cubic inch of impalpable powder of salt, and having this dissolved, we repeat with this last alteration Experiment No. 2,—that is, we add a cubic inch of salt powder, so that the conditions remain identical in both, *except that we use a solution of salt instead of pure water.* Observe the result—the instantaneous change of bulk of the solid,—the greater quantity and density of the liquid,—and *an amount of solid left undissolved, that is in excess of that left in No. 2 by exactly the one-third of a cubic inch originally dissolved in the water.*

All this again, is the work of an instant.

Proceeding to No. 4, we add to the one cubic inch of water the cubic inch of salt, previously cut into 16 smaller cubes. Again we see a change, the work of an instant. A change *exactly* like that seen in No. 1, only instead of the loss of so small a quantity of water and salt as in No. 1, we observe that 256 times as much water has disappeared and 256 times as much salt also, while 256 times as much solution has been formed. We also observe that, upon stirring the contents of this vessel, more and more salt disappears and the liquid increases in bulk and weight, until the loss of salt and increase of liquid ceases.

In Nos. 5 and 6, the addition of salt to the saturated solution and oil to the water, produce no noticeable change whatever, nor does stirring them together alter their appearance.

We are now ready to compare results.

In No. 1 we have, in an instant of time, formed out of two different substances three distinct bodies. Comparing the new liquid body with the new liquid body resulting in Nos. 2, 3, and 4, we find them *identical in every respect.* We have also observed that the *formation* of this body was instantaneous upon contact of surfaces possessing power of attraction, and that this attraction is just as great between all bodies possessing it. Without altering conditions, if there is no attraction, time alone will not be a factor. For in all our examples we have seen that when the new body (which we have named *saturated solution*) has been formed, the action of solution ceases, and the salt and solution remain exactly *as if they were foreign to each other as the water and oil of No. 6.* A further examination of No. 1 is needed before we can sum up the results of these experiments. The new body which has formed the instant contact was effected, is observed almost in the same instant of its formation to be *in motion;* not permitted to be subject alone to the first attraction, which for the instant guided its motion in one direction, gravitation, temperature, and other forces of attraction or repulsion are constantly at work, and influenced by these forces, the newly formed liquid is forced to move *from* the solid and give way to liquid which has not yet come into contact with the surface of the solid. Instantly the same attraction is exerted as before and the same resultant solution is formed. Instant after instant passes and constantly the same movement of liquid and resultant solution takes place, until, when this ceases, we find that we have again only two distinct bodies, the saturated solution identical in bulk and every other property to the resultant of Nos. 2, 3, and 4. We weigh the salt remaining, and it too weighs just as much as the impalpable salt. We compare the result of the first moment of contact in No. 1 with No. 4, and find that the quantity of dissolved matter is in direct correspondence to the amount of surface exposed—as 1 is to 256. We notice in every case that each varying condition, while it alters the *manner* in which the result is attained, does not alter the *value* of the result, except within the limits of that condition.

Our observations are as follows:

a. *Solution depends upon affinity and contact, and where there is no affinity there is no solution, also where there is no contact there is no solution.*

b. *The time necessary for solution is the same for all soluble bodies in contact, and depends, under similar conditions, upon the extent of surface exposed.*

c. *The time necessary for solution of a succession of surfaces such as solids, will depend upon the rapidity with which they can be exposed to more of the same solvent.*

d. *The quantity of matter dissolved in any given time will be in proportion to the relation of the solvents to the point of saturation.*

We have thus far made use in our experiments of several methods of obtaining solution. They are: Maceration, comminution, stirring, temperature, and gravitation.

Maceration, as seen in our first experiment, consists in allowing the matter dissolving to come in contact with the solvent, unassisted by anything but the natural results of such contact. As in all practical examples of matter dissolving, a succession of layers of solvent and substance is presented, that cause a more or less longer or shorter time to pass (since time is the measure of successions). When the layers are few, the time will be limited, but when they are many, *the ratio of time becomes one of the most serious obstacles to the use of maceration.*

Comminution, together with stirring, is the method used in Nos. 2, 3, and 4. Its advantage consists in exposing the greatest extent of surface of solid to contact with the greatest extent and quickest succession of liquid. As the greatest subdivision produces the greatest *exposed* surface and the rapidity of *stirring* the quickest succession of surfaces, we have in comminution, with stirring, the greatest amount of time saved.

Stirring without comminution, or comminution without stirring, necessarily produce, each, only part of the advantage which is obtained when using both; the advantage is therefore limited to the extent to which either are applied.

Gravitation is used in the first process, and without this assistant we would have only the first layer of solution formed. Gravitation assists by removing each new layer, which is followed thus by still another, and so on. Gravitation is thus nothing more to our solution than a more or less slow process of stirring.

Temperature is a factor that has been at work in each example, and while we have maintained the same temperature in each, we have not noticed the importance to be attached to it. In the first example it was the changing temperature of the solution and the constantly varying temperature of different parts of the liquid that caused it to move and bring, according to the rapidity of this motion, a more or less rapid succession of surfaces. An elevation of temperature (we will suppose our experiments to have been made at an elevated temperature) produces a marked limpidity of fluid; when, upon standing, the temperature becoming reduced through loss by radiation, reflection, etc., we again examine the fluid, it will be found reduced in mobility. Thus, temperature is of value as a process of stirring, and this value depends upon the degree to which it can be carried.

Another effect of temperature, which we find in our examples, is that the reduction in temperature produces in some instances a return to the solid part of the solution, in others, the reverse is true, a greater amount of substance enters into solution; therefore, when we select our substance to be dissolved, it becomes important to know the best temperature at which solution will be effected, *since in this respect temperature does not follow a universal law, but acts only as a varying condition.*

Having acquired a knowledge of the governing features of solution, we will be able to compare *processes* of solution according to the advantages of each.

The uses to which solutions are put are either for the purpose of obtaining the one or more of its compound parts in a liquid form. *When the object is to use only the solid part in solution,* we can select any solvent, and the one best suited to our wants will be the one to be preferred. *When the object is to use the solution* AS SUCH, we have no choice in our solvent.

The method of dissolving the solid will depend upon its condition and the degree of practicability to the method of application. Comminution and stirring is, if feasible, of first advantage. If the state of comminution is limited, more stirring should be resorted to in order to accomplish the same result. If stirring is limited or impracticable, maceration can, as a slower process of stirring, answer, but would waste time. A less waste of time is encountered if heat can be applied, but one must not lose sight of the fact that *heat alters the* RESULT *as well as the* MEANS *to this result, and that as such a factor it must be equally as important to find out if* LESS *amount of heat will not be a better means to the end.*

We have thus far studied solution and compared the methods of *arriving at* solution. We have yet to study the method that more nearly affords an answer to our problem, and that is, *how to obtain this solution*, how to *separate* the newly formed solution from the solid left undissolved and the liquid not yet changed.

Among the methods resorted to for separating the solids from the liquids, we have *decantation and filtration.*

In decantation, we simply pour off the liquid from the solid. This can only be resorted to when the solid is either heavier or lighter than the liquid, so that it will not be carried away with it. If the amount of solid is large, the adhering liquid will be hard to obtain by draining, so that, if this liquid is desirable on account of the solid it holds in solution, we must resort to some means of obtaining it, or else consider it as so much loss.

In filtration, we use a filter, an insoluble, cohering substance, through which liquids can more or less readily flow, while not admitting the passage of solid. This filter we place in such a position as to allow the liquid and solid to rest upon it, and be subject to the action of gravitation or other force of pressure. The liquid being more mobile, passes through this substance, which offers more or less resistance to the action of gravitation, or other force used, but is, nevertheless, entirely overcome by the liquid, and passing through the filter, flows into a vessel of some kind. In this manner the liquid is separated from the solid. We notice by applying these two methods that practically the process of decantation is the *most rapid*, but that when the quantity and condition of resultant liquid is measured the process of filtration has at times, on account of the varying methods in which it can be applied, several advantages.

These methods will need a brief description:

We have, first, *simple filtration*; second, *expression*; third, *percolation*.

In simple filtration we have solution already effected, and we allow the process of gravitation, assisted by the pressure of overlying liquid, to overcome the resistance of capillary attraction and cohesion of the liquid for the solid. This process, if allowed to end here, offers little advantage over decantation, but whereas in decantation, to obtain the remaining solution when the solid left cannot enter into solution, it is necessary to stir the solid with fresh liquid, thus causing a dilution of the solution desired, and obtaining a fraction of it only, in filtration the solid rests upon the filtering medium, and the solution being denser than the solvent, can be forced through by the pressure of the lighter liquid above. Thus the problem is, how to obtain the solution already formed; simple filtration has in the instance named an advantage over decantation.

Expression is another method of filtration. Here no advantage is taken of the pressure of gravitation, which is slow, but an artificial pressure is resorted to, which, according to its intensity, forces the mobile liquid from its cohering solid. As the force is only exerted within certain limits, only a corresponding fraction of the solution will be forced out. While, therefore, simple expression would yield results far superior *in point of time* to filtration, it offers the same criticism that is applied to decantation—except that the yield would be greater; the advantage of decantation would be, that if pulverization had been once effected, the residue would need to be merely stirred with fresh solvent, and again drained; whereas, in expression, comminution would again have to be resorted to.

Percolation, the third process of filtration, lays claim to a combination of methods. As originally used it differed from filtration in insisting upon combining all the advantages of solution possible; thus in filtration, comminution is not necessary, nor is it in expression, though, the results are better with it, while in percolation this is one of the *essential* parts of the process. In simple filtration and in expression, being only the *ends of the process of solution*, the means to this end are maceration, comminution, and stirring. In percolation the advantages of maceration, comminution and gravitation, the essential features of solution, are combined in such a manner as to secure, with proper care, not only solution but abstraction of this solution.

This method necessitates an apparatus that suggests the filter, with the only difference that the comminuted solid is placed over the filtering medium, and the solvent instead of being allowed to come into contact with the surfaces of solid by stirring, is allowed to move downward according to the law of gravitation, and in its course come in contact with the successive portions of solid. It will be thus readily seen that as compared with comminution and stirring, if the state of comminution is the same, and the solids soluble, it offers no advantage over the latter, except in the amount of personal attention. But solids, from which and out of which a solution is to be extracted, are not always completely soluble. *Such partly soluble solids may have the soluble matter in contact with their external surfaces.* Percolation in such a case would be a means of conducting the solution and abstraction in one operation, as in the familiar example of leaching or lixiviation, or such solids may be subjected to the operation of maceration and expression, maceration and decantation, maceration and filtration, the results varying only in degree. The results obtained in the latter processes have already been compared, and according as a value is placed upon time, labor, liquid solvent, and solution, the value by comparison is easily made. If the value of the solution is of first importance, percolation would be first in point of merit, as the greatest amount of solution with the smallest amount of solvent is thus obtainable. If time alone is important, expression would be an object, and decantation be of *first* importance, but as it is usually not *one*, but a *combination* of advantages that are sought, the process of percolation has the right to claim its place as the most important method of obtaining solutions of such solids. In pharmacy, one method of percolation, of obtaining solutions of gum resins, gums, mixed and largely soluble powders, and lately syrups have been used for some time, and to these the above criticism is applicable. If the solution desired is a weak one the method is quite applicable, but if it is desired to have a nearly saturated solution, the difficulties attending the use of an impalpable powder, the density of such a solution, and the time of contact necessary make the advantages of percolation compare unfavorably as to time with other processes. Thus, if it should take two weeks to percolate 2 pounds of finest powdered sugar with 1 pint of water, and only a few minutes stirring will accomplish the same thing, we would recommend stirring, and strain or filter afterward.

Another, and by far the largest class of solids of which we desire to obtain solutions, are not soluble completely, and *contain their soluble matter inclosed within an insoluble exterior.* This exterior, while it is itself insoluble, is permeable by liquids, capable of dissolving the solids within. These solids are composed of cellular structure, principally of vegetable origin. The cells of these drugs are mostly microscopic, and are practically not ruptured in the comminution they are subjected to for obtaining a solution of their contents. It was an oversight of this most important feature of the *condition* of this class of solids, that has led to the definition of percolation as of the *process of displacement*. This view of percolation is plainly due to the idea which has prevailed in almost all of the writings on this subject, that the cells become perpendicularly penetrated by the liquid solvent in its passage downward through the drug, while a fresh part of the liquid *completely* supplies the place of the original, which has passed down and which is in turn displaced by another fresh portion.

True percolation is not a simple process of displacement.

At the very start of the process, and all through it we are met by factors working in opposite directions, which we must not overlook. Sugar and salt, or ashes, it is true, are capable of being acted on by a solvent from their external surfaces, and when the solvent has acted upon them, the solution being heavier than the solvent, passes downward and is displaced by the next overlying stratum of liquid and so on, but *cellular tissue* envelops the soluble constituents of drugs, and these cells are not open tubes, as in water-pipes, capable of being passed through by liquids, but are closed spaces, and capable of being filled and emptied indirectly by a movement we call *osmosis*. It is of course plain that if cells are to be considered as closed spaces, liquids can only become charged with matter contained within them, upon the law of contact and solution, and must therefore be able to pass through and into the cells. Such a movement of liquids in and out of cells is only known as osmosis, and is governed by laws that are distinct and well known. It is now over a year since I had the honor of calling attention by theoretical demonstration, to the impossibility of exhausting drugs of cellular structure, on the grounds just stated. *Within* the cell the solvent action goes on, independent of the liquid *without*, so that in order to remove the more active matter within, it is necessary that the liquid surrounding the cell must be of a different density, thus insuring an exosmodic and endosmodic current until equilibrium is established. Thus the greatest possible exhaustion that can take place would be that by which the surrounding fluids were fully as dense as the fluid in the cell, for, were the fluid within to be less dense, the same forces would be as active in withdrawing from the surrounding fluid this excess *into the cell*. Thus, assuming, upon being moistened, that all the cells have absorbed sufficient solvent to hold the active matter in solution, the process of depriving the cells of their soluble matter can *only* go on, by having each successive layer abstract a fraction of the active matter, but leaving the layer of cells full of the same fluid holding the fraction left, only to be again and again deprived of a *fraction of what was left*. We can thus see, while we can proceed with an infinite number of layers, we still will have an infinite fraction left.

Bearing in mind the above statements let us assume a percolator containing three layers in height of drug, upon which we pour just sufficient menstruum to completely occupy all the possible space in the first layer, both between and within the cells, equivalent to one-half the whole surface area, the solid matter occupying the other half. Within the cells the solvent action of the menstruum is dissolving the matter soluble in it, without, lies a menstruum with no material to act upon (we assume that none of the cells have been broken or ruptured), consequently an osmodic current is immediately established, the heavier dissolved matter within passes downward out of the cell displacing lighter liquid, which is forced up by its lighter gravity, and thus gradually the matter within the cells dissolves and circulates until no longer the liquid without the cells is heavier or lighter than that within.

A certain time is needed to allow a proper solution of material to take place, and then we are ready for the next step.

If we now pour an equal amount of liquid upon the drugs as before, it will force the liquid occupying the space between the cells down by *displacement*, but the fluid, not between, but *within* the cells, *will re-*

main only to be forced downward by a process (osmosis) slower and somewhat similar but not identical to that of displacement.

Now we have the second layer containing *one-half the dissolved matter contained in the first layer* (assuming again the liquid between the cell walls is equal in volume to that within them) *and one-half pure menstruum mixed*, beginning its solvent action upon the second layer of cells, and when this is complete the liquid between the cells of the second layer will contain *one-half of the dissolved matter from the second row, and one-fourth of the first layer.* This is, by the addition of another volume of liquid passed to the third layer with an equivalent amount displaced from the second, and the process of osmosis goes on, and when all three layers of liquid have been displaced by the addition of three more, the amount of soluble matter left within the percolator would be about $\frac{1}{17}$ the whole amount soluble; if five layers are considered, and five layers of liquid forced out with ten, so that five remain in the drug, the amount left would only be $\frac{1}{90}$ of the whole. Thus, while it is plain *perfect exhaustion* is from its very nature in cell percolation an impossibility (similar to an air pump vacuum), we can arrive at practically sufficient definite results for all pharmaceutical purposes.

Thus, if percolation is recognized as "the process of displacement," we must expect to be able to *displace* the whole of the dissolved matter, and *do* in the case of such solids as sugar, salt, etc. Yet, in cell percolation, *we can never arrive at such a result.* The distinction does not end here, for, while in simple percolation a point is easily reached where the whole amount soluble is abstracted after solution, in cell percolation the impalpable nature of the active matter is such (the cell which surrounds it being microscopic), as to expose the greatest amount of surface to the absorbed liquid, therefore, when the cells are once filled by absorption with the solvent, it is fair to presume, *the solid is entirely in a state of solution, though not capable of being entirely extracted from the drug.* On account of the nature of osmosis and the defects of this percolation, this abstraction can, as has been shown, only be carried on to a limited extent, and the degree of exhaustion which is obtainable by various methods of percolation will vary with the varying conditions,—by a comparison of conditions we should be able to determine which are the most favorable or unfavorable in effecting this object.

Let us then study the best conditions *in the selection of the solvent.*

In pharmacy this solvent is rarely selected for its own intrinsic value as a medicinal agent, the choice between various solvents for a given purpose being determined by the degree of solvent power they exercise, the least extent to which they allow the medicinal value of the drug dissolved to remain unimpaired, and, other things being equal, the economy resulting. Thus, while alcohol of different dilutions is usually considered an excellent solvent, between water and alcohol, if they both accomplish the solution, the former will contend with alcohol for its selecting as solvent on both medicinal, economic, and, as we shall demonstrate further on, on practical grounds. The pharmacist, as a business man, is forced to ignore none of these things; on the one side he competes with his neighbor in price, and yet desires to furnish preparations of first quality, permanence, elegance, and definiteness combined.

Thus it is plain that, in all percolation, *one of the tests of merit in conditions of solvent must be the ability to reach the interior of cells fully or nearly as rapidly as to pass round and by them.* The menstruum that will be most retarded in its passage will be (points of saturation being alike) the one yielding the best abstractive power. Thus water or aqueous menstrua, being more mobile, ought to be preferred in the selection of solvent, and should always be considered in a comparison of merit.

In this respect increased heat, while it may be of value in increasing the mobility of the fluid, *does not itself retard the flow of liquid downward*, but rather increases it, so that its advantages as an abstracting agent are not as real as apparent.

The action of liquids used in pharmacy as menstrua upon the cells is very marked. Thus water is absorbed by the cell walls with great avidity, causing an *expansion* of the cells, while pure alcohol *contracts* them, absorbing the moisture they contain. Thus a percolation conducted with a mixture of water and alcohol upon a more or less dry drug would, according to its aqueous or alcoholic nature and the power of attraction exerted by each, cause either an expansion of the drug, with an *increase* in the alcoholic strength of the percolate, or a contraction, with a *decrease* in its alcoholic strength. This variation in the very nature of the solvent as it passes through the drug, from the start to its close, would naturally vary its solvent action; a very aqueous solvent might become quite alcoholic before leaving the percolator, and *vice versâ*, so that this point must be considered *also* in the selection of the solvent.

In the selection of powder the degree of comminution is of a certain importance, since, if too coarsely powdered, the solvent would exert its influence much more upon the *surface* cells, and would need much greater time to traverse through the network of cells to reach the *interior* ones, while, at the same time, fluids would find comparatively little resistance to their downward flow. This resistance is regulated by the closeness with which the particles are brought together, causing more or less capillary attraction and friction, which must first be overcome by the perpendicular pressure of the liquid and the attraction of gravitation. What has been stated before as applied to solvent applies as well to solid—*one of the tests of merit in the conditions of powder must be the ability to retard the menstruum just enough in its passage to fully exert its influence upon the contents of the cells before allowing the fluid to pass.* While in theory a dusted powder would be more apt to have all its cells ruptured and thus reduce the percolation to a *veritable* process of displacement, in practice this result is attainable but rarely, and the menstrua to overcome the friction and capillary attraction would only be such as are strongly alcoholic or otherwise in their nature. An aqueous fluid would agglutinate the powder so as to form lumps, causing irregular channels, and this, added to the extra friction, would render the operation impracticable.

Within limits there *are* means by which the fluids can be retarded without resorting to the use of a very fine powder. *If we can compress the coarser particles together enough we can have spaces between particles smaller than with more comminuted powders not so tightly pressed.* Therefore it is plain the same advantage due to retarding the liquid will be gained, but in comparing the advantage of a coarser powder compressed and a finer powder not so tightly packed, in both of which the fluid is retarded alike, the finer powder would still have the advantage of having its interior cells more readily traversed than the coarser one—thus, to gain an equal advantage, more *time* must be given the coarser powder to macerate at every layer than the finer. This is why, too, ordinary maceration, given *time enough*, yielded results that were relatively better than poor percolations could do.

We have, thus far, studied solution; we have endeavored to find out the advantages of each method of *arriving at* solution; we have, step by step, tried to analyze the advantages and disadvantages of each method of *separating and obtaining solution.* We were then ready to pass our judgment upon the more complex problems of percolation. We have studied the advantages in the use of different qualities and conditions of our *solvent*, and discussed the most favorable conditions for the powder.

We are now better able to enter upon an examination of the *methods* used for applying percolation in the practices of pharmacy.

As an authority that was almost absolute, rarely contradicted, obeyed to the letter, and looked upon as the embodiment of the leading thought of our profession, was the Pharmacopœia of the United States, of 1870. Its teachings were gospel, and deviation from them a sin.

It is to be hoped that in the new one which has just been issued, and which I have not yet seen, enough judgment will be left to our modern pharmacist to enable him, in case he finds, in accordance with the advance of modern thought, in this most valuable but *not infallible* guide, something that can be bettered in detail, he is not held bound to the *shadow* instead of to the *substance*, to *detail* rather than to *results*. The method adopted by the Pharmacopœia of 1870. and which was supposed to be universally followed, was full of obstacles and hindrances to successfully and practically conduct the important operation of percolation. There have been, it is true, modifications suggested which are more or less entitled to consideration for the advantages they offer, and after criticising the official process we will be better able to judge of the proposed advantages of these modifications.

The practical pharmacist should be economical, yet he will find he is expected to follow blindly, implicitly, the formulas of his Pharmacopœia, regardless of expense, of time, of result, and of trouble. Even the details are made *without latitude*, and, almost invariably, they prove a barrier to his desire to utilize his spare time and talent, and, instead, make him pay a profit to others, whose methods are *undoubtedly different*, and whose scrupulous care *he is obliged to trust*—and this, too, simply on account of being conscientiously stopped by a detail he cannot overcome.

Let us look over the field and see the obstacles thrown in his way in the process of percolation.

He is first furnished with a particularly described percolator in which to conduct his percolation. He is next furnished with a particular grade of powder to exhaust, and I am not far out of the way when I say he cannot in nine cases out of ten, find such a powder in the market, *nor produce it* without adding so much to its cost as to pronounce his efforts unprofitable. Nor does our Pharmacopœia end here—he is next furnished with such expensive solvents that he can almost buy the fluid extract he wishes to make for the amount of this he is told to use! He is next directed to moisten his powder with solvent and let it stand for four days, *nearly* 6000 *minutes*. Then, first, he is supposed to start his little percolator, and *hurry up or not, as he pleases* in drops. It is plain our Pharmacopœia makers thought percolation was the process of displacement. By the time our practical pharmacist gets his fluid extract made the doctor will have buried his patient! *Yet for making tinctures no maceration whatever is advised*, not even in making tincture veratrum viride, in which eight troy ounces of drug are used for one pint of finished preparation.

In answering the questions as to why this *extreme* fineness of powder, in conjunction with maceration for so *long* a time, *with the entire menstruum, which is supposed to yield the solution*, why these high-priced menstrua, and why the drug should be moistened with so *large* a quantity of the solvent before packing, why the drug should be packed evenly and uniformly, why this indifference in making fluid extracts, —in which so much care is otherwise taken,—as to the use of a conical or cylindrical percolator, since only in the instance of fluid extract of ipecac is there a special caution given to use a conical percolator.

Why the necessity for a uniform powder when there is no uniform flow? It is plain that this want of latitude regarding the exact fineness of powder is due to the fact that the process was considered one of displacement, whereas, it is evident that without taking *time* into consideration *the fineness may vary with the closeness of packing.* The question of macerating with almost the entire menstruum for four days was also considered as necessary and correct according to the theories of the process of displacement. Time, it is true, is quite useful in macerating the moistened drug with *enough solvent to fill the cells;* after this a large share of the time is wasted that is used in establishing an equilibrium between the cells and their surroundings *throughout the entire drug* at one maceration. The proper way to *economize time* for the pharmacist is not to *waste* it, but *use* it. We have seen from our theoretical example, if we have an infinite number of layers of liquid percolating and macerating *alternately* through an infinite number of layers of drug, we get a practically complete percolation, also with as few as ten stoppings for five layers, if the time is long enough to thoroughly *equalize*, the result is within one per cent. of absolute exhaustion.

Therefore, if we were to pour the percolate in ten parts, one every hour, we should have a result that would be even better than the theoretical five layers, since a large number of layers of liquid and drug would be included in each part poured on; such a method according to the view of cell percolation, I take it, should yield a *far better* and *quicker* result than of pouring all on at one time to macerate. Reduce the alternate maceration and percolation to *minutes* and the quantity poured on reduced in the same proportion, the result obtained ought to be infinitely superior and the quantity of solvent needed *reduced to a minimum.*

The reasons for supposing such would be the case, are: 1st. The contents of the cells to be dissolved are infinitesimal in size and represent only, as a large average, extractive matter, not more than 20 per cent. of the weight of the drug, and as important active matter not more than 10 per cent. 2d. The fact that the percolation is usually carried on to an excess of the amount of solution desired and this excess of solution evaporated to a smaller bulk as in fluid extracts, indicates the little reliance placed on methods of procedure.

Why the high-priced menstrua?

Alcohol, water, and glycerin form the three principal solvents used in pharmacy. No one will question the value each of these possessed, but it ought not to be forgotten that water is not only the cheapest of these, but alters the medicinal value of the solution *least*, and *if practicable* should have been *most* selected.

While to a certain extent in the preparation of tinctures this was carried out, in the formulas for fluid extracts, we notice an almost entire absence of this, except for the purpose of forcing the menstruum through by displacing with diluted alcohol. Thus, ipecac, squills, rhubarb, and columbo, etc., have in preparing their tinctures, diluted alcohol, and for their fluid extracts, alcohol with glycerin as the solvent used. An examination into the probable cause for this, shows not that their active principles are *less* soluble in a more aqueous menstruum, but that the percolation of these drugs is with difficulty conducted in accordance with the process of prolonged maceration for fluid extracts,—even during the short period of percolation of their respective tinctures the cells swell enough to sometimes cause the lateral pressure of the drug to overcome and stop the downward flow of the liquid. This cannot in the ordinary percolator be overcome, except by taking the drug out and repacking it. Often the flow of fluid would be thus retarded, so as to take weeks to obtain only a small quantity of fluid extract. Therefore, in adopting the process of prolonged maceration and a choice of only one degree of fineness for each formula, and no special directions for any possible deviations from the strict rule, it is easy to see the cause for the expensive solvents used. Had these obstacles been *removable* in the process, without disadvantage, clearly a vast saving in the cost of menstrua would have occurred and the saving would have amounted to hundreds of thousands of dollars annually.

To remove this objection to the use of a more aqueous menstruum we must consider the cause and seek to overcome its influence. This the Pharmacopœia Committee did by removing as much as possible *the cause itself*. The remedy was expensive and not always practicable *then*.

The swelling drug and stoppage of flow are cause and effect.

To lessen the impact of the swelling drug would of course allow the swelling to proceed *a little farther* before it would resist the downward flow of the liquid. This remedy would be within *this* limit, one that would produce the desired result—but the accurate amount of swelling and the impact to put upon the drug are not known quantities, and the results would be uncertain.

Another way to lessen the impact would be to moisten the drug in another vessel, and after it has ceased to swell then pack into the percolator and proceed. This would answer if the quantity of solvent necessary to absorb before the cells ceased to expand was not too large, so as to cause the loss of too much solvent for the final abstraction of the solution in the cells.

To increase the velocity of the liquid would also produce the desired result. There are several ways of doing this.

A. By the application of heat. This renders the *fluid* more mobile and lessens the resistance of its friction, but again it increases the pressure by *still further expanding the cells*. The application of heat is limited, and the attendant danger in applying heat is also a hindrance to its use.

B. By means of a vacuum below the liquid percolating,—this yields within the limits of a vacuum, every means of forcing the liquid down, by increasing its pressure *without* correspondingly increasing the lateral swelling of the drug. Accordingly as it becomes easy of application, without evaporating or carrying away the *volatile* parts either of the drug or solvent, this method is of value for the result desired.

The same remarks apply to any increase of pressure upon the surface of the liquid.

C. Another method consists in increasing the hydrostatic pressure. This also simply increases the perpendicular pressure of the liquid, while it does *not increase* the pressure of the cells upon it, and is useful, therefore, according to its ease of application and the extent to which it can be carried.

In all these methods the feature of greatest importance is, *the degree to which this pressure can be regulated so as to secure not simply a more rapid flow to overcome the swelling drug, but* AT THE SAME TIME A THOROUGH OSMOSIS OR ABSTRACTION OF THE SOLUTION.

Why moisten the drug with a large per cent. of the menstruum before packing? The only object that seems to have been sought for by the Pharmacopœia, is to allow the flow of the solvent through the drug to be as even as possible, and as the fresh liquid would press the liquid absorbed by the cells and interspaces down, and fill their place instead, a more even percolation would result. Possibly another object sought was a preliminary swelling before packing, but this seems hardly probable from the nature of the solvent used to moisten with. The use of a quantity of solvent to moisten the drug and cause the even flow of the liquid, *is advisable*, but the necessity for the use of any more than is necessary for the purpose, is a loss to the final process of extraction of the solvent, and it would afford an amount of *consecutive liquid layers*, equivalent to a good fraction of the quantity officially used toward the last to secure the completion of the process. Whether this would be a disadvantage or advantage, would depend upon the value to be attached to moistening the drug as a means of first securing the *solution* within the cells. Several other methods, such as moistening either the upper half or lower half most, and securing for the other half the advantages of thorough percolation might do. The value of these deviations is still to be determined.

Why the drug should be packed evenly or uniformly. This, upon first consideration, appears to have been the proper method of securing a regulated flow through the percolator; but in the first place, the pressure at the bottom of the percolator is far greater than at the top, and is due to the weight of all the drug and liquid resting upon it, this therefore increases uniformly as the distance from top of the powder and liquid increases; again as the liquid percolating also increases in density and becomes less mobile, according to the *same* ratio,—*to retain the same velocity throughout*, the drug should, for *both* these reasons, *offer less and less resistance as the liquid goes down, and should be packed more and more tightly as it is being packed into the percolator.* This is not easy to do in the ordinary percolator, since any attempt to press upon the top of the ground drug would naturally press the whole of the powder tighter instead of only the layer we desire to have packed tighter; however, to a limited extent, this can, with care, be done.

What is to become of the alcohol left in the drug?

The official process says nothing about this, but it is easy to see that it is not readily obtained without washing with water, either by taking the drug out and mixing it up with water or percolating water through by means of the above described methods of increasing the liquid pressure, or else recovering part of the solvent by expression or by distillation of whole material. The quantity obtainable in these different processes, and the time and personal attention each method would need to restore the alcohol, would be a way of comparing relative values of each. Other *methods* than the official process have been proposed, and among these the oldest and one most favorably noticed has been Dr. Squibb's repercolation process. All the experiments I have seen recorded show that he too has the same view of percolation that we see in the workings of the Pharmacopœia. He too, pours most of his menstruum upon his drug, only he uses a still larger amount to macerate with, and macerates for two days instead of four, an economy of *time* at least. He thus secures a somewhat more aqueous menstruum than in the official process, by moistening the drug with an equal part of menstruum. He however fails to receive the benefits of thorough extraction if he *does* secure thorough solution, and thus is obliged to apparently "beg the question" by obtaining an excess of percolate, and then in order to hide this defect, carry out the percolation in parts, using the extra "last run" as a solvent, instead of the original. This is not very accurate, to say the least, for, quoting from him (p. 724, Proceedings Am. Pharm. Assoc., 1878): "*All this leads to an inference that the residue left behind splits up the menstruum and* *holds on to more of the water, or more of the glycerin, or more of both.*" How easy now to see why he claims that it appears the reserves are better solvents than the original menstrua. Water originally existed in all vegetables, more or less, and the necessity of drying the latter with *heat force* shows the power the cells possess to again *absorb* water, when presented to them in such close contact, and therefore, according to the nature of the drug, an always *more alcoholic* fluid is found in the percolate than in the menstruum. This is why diluted alcohol will percolate through buchu, and becoming more alcoholic (buchu being a great absorbent of water), will thoroughly dissolve the oil and hold it, and *therefore it is not diluted alcohol* that can dissolve it, since it *never did*. Another reason for the "splitting up" of the menstruum is seen in the theory of cell percolation,—*all* of the original menstruum *cannot* be recovered, and an excess of menstruum must be used to obtain a given quantity of percolate that will be nearly uniform. True there is some gain in using the reserved percolate *in a defective percolation*, but the inaccuracy of the menstruum employed, and the fact that the defective percolation is not stopped but continued, and, finally, an allowance of 6 per cent. is made for this defectiveness, would seem to show that *perhaps* if this allowance was made *first* as last, the result would be the same. Thus, repercolation, while it economizes in time and solvent, does so only to a limited extent, and upon this limit it can be compared in value with any other process.

Another *method*, presented by Professor C. Lewis Diehl, upon which a large series of experiments have been based, consists essentially of a modification of Professor Procter's process of simple percolation of the last Pharmacopœia, and was intended to illustrate the points of applicability of the use of heat and the question of how much percolate should be set aside and not evaporated, while subjecting the balance to a reduction in volume *by heat*, to make up a definite amount when added to the reserved part. As the experiments were to be parallel, and the percolation was conducted upon the same defective methods of the official process, we cannot expect as valuable data as if they had been under *more complete* variations in conditions of percolation.

The apparatus for conducting the percolation is officially described, and consists of cylindrical and conical receptacles with means for preventing the exit of the powder while allowing the liquid to pass freely, and each is supposed to be used when directed. A reason for *preferment* must be found, since the general directions instruct us to use *either*, unless specially directed. The reason is on examination found to be due to more or less resistance to the swelling drug offered by the walls of each. The conical one, allowing a *greater* expansion, and thus proving more suitable for excessively swelling drugs, and the cylindrical for drugs less given to this effect. The first thing noticeable is, that in conical percolators *an attempt*, at least, is made in the official process, to overcome the swelling drug *by adapting the apparatus to suit the necessity.* But, as has been before criticised, it is only to a limited extent that this removes the difficulty, and the drug swelling occupies more bulk and absorbs more menstruum, thus proving an expensive and not thoroughly effectual way of overcoming this defect.

Another method that has been used for adapting the percolator to the work it must do has been the use of a hot-water jacket around the percolator, both for dissolving and rendering the solvent more fluid, thus overcoming the effect of the swelling drug. If the increased heat *assists* the solution and does not injure the resultant, the application of heat would be useful, in so far as it can render the liquid *more mobile*, but as it also *assists the swelling of the drug*, it may not thoroughly or effectually answer for any amount of swelling (the enormity of which I will further on illustrate). But its defective application *in the jacket* must not be overlooked. By heating the contents of the percolator *it does so in a direct ratio as the distance from the jacket to the centre increases*, and the mobility produced would be in the *same* ratio, thus causing a more rapid flow downwards *at the sides* than in the centre. The application of heat for this purpose is, therefore, of limited value, according to the nature of its mode of application.

An apparatus for accomplishing the same results was lately illustrated in the "American Journal of Pharmacy." A vacuum was used for preventing the stoppage of flow ; and this method certainly accomplishes the desideratum of a more rapid flow, but offers the objection that *volatile bodies would become lost* and the regulation of the rate of flow is not easily adjustable, so that a vacuum once established, it might cause a too rapid flow of menstruum into the drug and out again. The shape of the vessel is made so as to *allow of the swelling of the drug*, thus insuring a *waste of menstruum*.

In a very valuable paper read before this Association, in 1879, by Professor J. U. Lloyd, the advantages of a greater proportionate length of column for the percolator was clearly and conclusively shown on the ground of the increased numbers of consecutive contacts, and, as the velocity is an accelerated force, this length of column in ratio increases the mobility of the liquid, thus also assisting in overcoming the pressure.

An increase in the hydrostatic pressure of the liquid was described in the "American Journal of Pharmacy" by means of introducing a floating cylinder within the percolator to maintain an increased height of liquid, and this, it is easily seen, secures the result *within the limits of the pressure exerted by the increased height.*

In this, as in all percolators relying on air or vacuum for pressure, this pressure diminishes constantly from the time the vacuum becomes filled with the percolate, or the air pressing upon the menstruum has expanded and forced the menstruum out, while, as the drug is not liable to decrease swelling, a more constant pressure is needed.

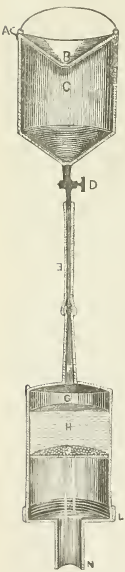
On page 932 of the U. S. D., thirteenth edition, 1870, is described as follows: "When it is wished to operate upon a very fine powder, it may be found advisable to increase the height of the column of liquid by making the *top* of the cylinder air-tight and inserting a *tin tube* several feet long, *which must be kept filled with liquid*. All the substantial advantages of this method (percolation) may be obtained without pressure." Here, then, we have an increase in the perpendicular height, which is far greater than that of the height of the percolator itself. This is open to the objection, however, of *having to be kept full*, and that, too, with *as much menstruum as is needed to fill the percolator from the point where the drug lies to the top of the containing vessel, and as much higher as the tube*. Opening from the top to receive and empty its solid contents, its air-tight condition was undoubtedly a serious objection to its use, and the necessity of keeping the tube full another one. Here the drug, too, if it cannot swell laterally, will swell under an increased pressure perpendicularly, and then absorb more menstruum than if kept in place.

Another apparatus, the invention of Mr. C. A. Smith, of Cincinnati, by which the menstruum is made to enter the percolator in the state of hot vapor, and is condensed in the percolator, and passes over the drug, is deserving of attention as applying the principle of the heated liquid under the alternate vacuum and pressure of the condenser surrounding the percolator; but while heat here is secured in a more uniform way than by means of the jacket, it is subject to a question regarding the nature of the menstruum thus yielded; if pure alcohol, this process would often answer very well, but if more or less a mixture of alcohol and water, the resultant condensed liquid would vary during the entire distillation of the mixture, and an uncertain factor in percolation be presented. These, then, were the principal known methods of adapting the apparatus used to the work as well as the work to the apparatus. It was in the spring of 1881, when, without knowing that the hydrostatic principle had ever been used (things which I have since ascertained), I constructed the following-described apparatus:

It is in construction an ordinary percolator, *F, G, H*, etc., inverted, with the former discharge-end, which is constricted, attached to a tube and reservoir for containing the menstruum. A perforated diaphragm, *C*, is placed inside, through the now lower and wide end of the containing-vessel, against the constricted inlet for the solvent.

The drug is placed in the same manner against this, and is packed into it as in ordinary percolators. A second diaphragm, J, is now in the same manner secured to the drug by suitable means to prevent the escape of solids but allow the free discharge of the liquid. This is substantially the apparatus as first presented to public inspection in the spring of 1881.

FIG. 66.



A cap for guiding the exit of the liquid solvent was placed over the wide discharge-end and, after various means were vainly tried for readily securing the diaphragm in place, a strong, sliding rod was used to support it to the variable height of the solid, and this secured by a removable set screw and crossbar, K, secured at their extremities by opposite internally projecting fixed lugs. By means of a flexible tube, E, a variable height of the menstruum is secured, thus rendering the pressure which it is necessary to give the solvent to overcome the resistance of the drug regulatable to a nicety by means of suspending the reservoir containing the menstruum upon a pulley to any desired height, raising it if not sufficient, and lowering it if the flow indicates the pressure is too great; *thus percolation can go on with ease at the will of the operator, and not at the apparent caprice of the drug.*

As the drug is occupying the complete space between the constricted inlet to the points of exit from the drug, there is no enlarged space within the percolator to waste menstruum before the static pressure of the column is secured; thus, till almost the last of the menstruum has forced itself into the drug, the use of this pressure is obtained, the upper diaphragm simply spreading the liquid as it enters over the entire upper surface, and causing thus an even flow downward.

In this percolator, by packing tighter at the bottom and less so as you proceed, while it is inverse of our rule for packing, when the percolator becomes inverted, and we wish to begin percolating, we find the inversion secures us the best method of applying this rule for packing, for we now have the drug packed *tighter at the top and less so proceeding downward.*

The ease with which the flexible tube, through raising and lowering the reservoir and column, can secure a regulated flow of liquid by increasing or decreasing the pressure, or, by pinching the tube, arresting it altogether, is another advantage this apparatus possesses.

The time that can be saved by allowing maceration and percolation to proceed alternately from the start without waiting for the drug to swell is also noticeable in this apparatus.

The almost complete exclusion of air or chance for evaporation is another feature of this apparatus.

Hot liquids can be, in this apparatus, introduced, and if the cells do expand more, the hydrostatic pressure being independent of the heat, can always control the flow regardless of this effect.

As the drug is held between the two diaphragms and is securely fastened, the swelling of the cells if it takes place must be upon themselves, and thus act as a strong press, causing their contents to be constantly filled and emptied, and allowing only of a minimum amount of liquid to surround the drug at a given time, thus cause a greater amount of successive contacts within and surrounding the cells, and a minimum of menstruum wasted by absorption.

Again, when the drug has absorbed the solvent, instead of pouring more of the same solvent or only a slightly less alcoholic liquid, pure water can be introduced, and will be able to force the solvent through just as well, so by allowing whatever with practice we will find necessary, for admixture, absorption, and incomplete abstraction from the cells, the amount of menstruum needed can be reduced to a minimum.

The disadvantage of this apparatus is its being thus far made of tinned metal or tinned copper, and for the use of acids this would prove objectionable, the demand not warranting the extensive experiments necessary to introduce glass, stoneware, etc. The swelling of the drug can only be measured in this percolator by the experience of the short time they have been in practice. As an illustration I present you with a cross bar of brass, that is 1½ inch thick, and 15 inches long, that broke from the strain upon it. In the first percolators, wishing to avoid the use of a supporting rod, and not knowing the extreme extent of this swelling, the diaphragm was held by the friction of an eccentric fastened to the sides of the percolator. When water was put into this apparatus and the material consisted of mucilaginous drugs, such as ginger, buchu, etc., the diaphragm could not thus be held in place. Cross-bars of cast-iron snapped like wood, and as a result, in the very large sizes a spring had to be attached to the rod, to allow of a partial swelling, as the best way to prevent the breaking of the cross-bar. The cylinders of metal first made were also not strong enough and had to be strengthened to prevent their bursting.

A feature not intended to accomplish the object of these percolators, but simply to abstract the percolate after it has left the strainer, is seen in the Squibb Percolator. A siphon draws off the percolate from below the drug; but unless the siphon is placed upon the very bottom of the vessel, the heavier percolates will be left in the lower part of the vessel, and will not be apt to ascend the siphon. A careful adjustment of this siphon would not altogether overcome the disadvantage, besides the least movement of the siphon would leave a channel for the liquid not desirable.

In the study thus entailed and the new features involved and brought out in presenting the correct principles of the process of percolation there has arisen a new necessity in the perfecting of mechanism for percolation. The theory of *time* necessary to *equalize* the layers of liquid lying outside of the cells before they should be forced down further, and in order that their velocity should be checked and the direction of the current guided by the law of osmodic attraction, has led me to make a new device, to take the place of the pharmacist's personal supervision to the proper flow, maceration and percolation of his drug, and to do, with a degree of accuracy, better, and more for him at a time, than he could do with his personal attention.

I have before you a clock attached to which is a stop cock, running by gear and a weight and pulley to supply the proper force. By attaching the flexible inlet tube to the one end of this stop-cock and attaching the other to the percolator, either direct or by another tube, I can, by opening the pinch-cock of the tube, cause a flow of liquid into the percolator, for a given time, and then as the stop-cock revolves, shut off this supply for a similar period of time. This clock causes the alternate opening and shutting of the stop-cock to take place every five minutes. By regulating the height at which the weight is hung from the pulley, a period of several days can be made necessary before it needs winding up. This one will go for twelve hours in a fall of 2½ feet.

The value of such a mechanism for experimental work cannot be estimated. While of course manual labor can be substituted for opening and shutting the stop-cock, the regularity with which this can be done, the constancy of its operation both day and night, suggests its value in experimental and laboratory work. Attachable to any percolator, whether inverted or otherwise, it can stop the flow and start it equally as well.

The expense of this form of apparatus is such as to preclude its popular use, but possibly other means will be found that can cheapen the expensiveness of the mechanism. The quantity of work that can be done, however, with a single clock is not as limited as it will appear. By connecting several reservoirs with its inlet, while one percolator is macerating another of these can be percolating, or where the menstruum is the same for a number of percolators, as is often the case, a single reservoir and tube serves for inlet and numerous tubes for outlet.

The field for research is thus opened to a different view with means at hand for easily accomplishing the result if desired.

With this apparatus or method, instead of waiting for a maceration throughout the drug, it begins where percolation first begins and *wasting no time* keeps on until the supply of liquid ceases, or the operation is completed. Alternate maceration and percolation thus secured leaves little to be desired for making percolation a success with every one.

We are drawing to a close.

We have studied the process of percolation; we have found the laws that govern the solution and the solvent, the drug and the resultant preparation; we have reviewed the devices and mechanism applicable to accomplish our purpose, and can condense as the results of these operations the following rules:

1. *Percolation should be done with the minimum quantity of solvent that can practically accomplish the solution of the desired quantity of matter.*

2. *In the selection of solvents of equal power as such only, the one least altering the medicinal value and possessing the least mobility should be selected, keeping in view the cheapest solvent when other things are equal.*

3. *Percolation for obtaining a solution of solids soluble from their exterior surfaces becomes less advantageous as the quantity of insoluble matter lessens in bulk in proportion to the soluble.*

4. *Percolation of cellular structure is more advantageous as the quantity of insoluble matter increases in bulk in proportion to the soluble.*

5. *All percolation should practically be a succession of macerations proceeding downward, and either be slow and continuous or interrupted for short periods, and then admitting of a greater rapidity of flow.*

6. *The periods of maceration at any given point should not exceed the time necessary for the solution of the desired substances, and the establishment of an equilibrium in the state of the solution in each layer.*

7. *In displacement percolation complete solution and abstraction of solution* MUST *take place.*

In cell percolation complete solution must, but abstraction from the cells, CANNOT *completely take place.*

In cell percolation the fineness of powder must be adjusted to the menstruum, and so finely divided as practically to resist the flow of liquid enough to prevent its too rapid flow, and yet not entirely stop it.

8. *It should be moistened with only just sufficient solvent before packing, to cause an even flow of liquid, and to partially or completely dissolve the substances within the cells.*

9. *The ground drug should be packed into the percolator with greater force*

toward the top than toward the bottom in proportion, to cause a more uniform flow.

10. *The packing of the drug should be in accordance with the degree of fineness and the nature of the solvent, and should be tighter in proportion as the degree becomes coarser, and more loosely packed as the solvent is more aqueous.*

By increasing the velocity of the solvent or lessening the resistance of the drug, the percolation may be maintained.

11. *The percolating vessel should be selected according to the advantages it possesses in assisting in general or special cases the process of percolation.*

12. *Between percolators of equal capacity, the one that has the least diameter is to be preferred whenever this is practicable.*

PROSPECTUS.

We have summed up the guides to be used in conducting the process of percolation, and have, in pointing out the ways to secure these results, gone to the end of the known; we can look now ahead and view the field yet to be gone over.

But before closing, let me not fail to point to a lesson this study has brought to us. In these days of social progress, when every pharmacist is obliged to be more and more intelligent, and when he is obliged to rely upon his talent to bring him his return for his previous mental training, why should the processes of his Pharmacopœia, the guide he conscientiously accepts, be so niggardly in its return of confidence as to lay down to him the narrow, straight and rugged path to his compensation for the sake of the shadow that accompanies the substance, instead of pointing out the broader road, full of light, guiding him to the goal he is seeking.

Why not define fluid extracts and other preparations as definitely as they can be defined, and while willingly showing the pharmacist all processes, leave the road open to his intelligent judgment.

I am aware I have omitted much, but have endeavored to cull the unimportant; perhaps not with sufficient judgment.

I will be accused of bringing no examples in practice in support of the views entertained in this paper, but in explanation I must say the examples in this case could only have followed the theory too recent for practical verification, in so far as the theory was first built from examples that have been established as facts, and criticisms applied must stand as such until our future observation shall, and without doubt, help to still further elaborate and broaden our views.

We have much work to do to verify by future experiment. How much the variation in the strength of alcohol during percolation affects the percolate at its various stages, and how this can be obviated is left for experimental research in the future. The microscope will perhaps reveal to us as much of cell percolation if not more than the practice can. Perfection in apparatus and solvent in state of comminution, and in the plan of percolation, will follow one by one, and the day is drawing near when the standard of pharmacy shall be planted upon every battlemented height of percolation.

THE ALCOHOLIC STRENGTH OF COMMERCIAL FLUID EXTRACTS.*

BY ADAM CONRATH.

QUERY 21. What is the alcoholic strength of the fluid extracts of commerce?

IN order to solve this query in the most satisfactory way, and with the least trouble, I selected the fluid extracts from four manufacturers most used in this locality.

The preparations from twelve drugs, in which the different formulas of the Pharmacopœia are represented, were taken from each manufacturer. Then, for comparison, the same preparations were made strictly according to the Pharmacopœia, taking, however, no more than ordinary precaution in the selection of the drugs and the prevention of evaporation.

The drugs were not subjected to drying, but were used as found on the shelf. The temperature of the room in which the preparations were made varied between 60° and 70° F. All these experiments were made during February, 1882.

The mode of estimating the percentage of alcohol was carried out as follows: 25 c.c. of the fluid extract were placed in a 4-ounce flask, the pipette rinsed with 25 c.c. of water and this added to the extract. Distillation was then proceeded with until from 30 to 45 c.c., according to the nature of the extract, had distilled over.

The distillate was diluted with distilled water to measure 50 c.c., and the specific gravity of this taken at 60° F. The alcohol percentage was therefrom deducted according to Stampfer's table in "Hager's Pharmac. Praxis." The percentage thus formed, multiplied by two, was placed down as the per cent. in 25 c.c. of the extract.

The preparations of Allaire, Woodward & Co., Wyeth & Bro., and Parke, Davis & Co., were taken from unbroken packages, kindly placed at the disposal of the writer by a wholesale firm of this city. The preparations of Squibb were taken from open packages on the shelf. In addition to the estimation of the alcohol, the specific gravity of each extract was also taken.

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* Read at the Fourth Session.

FLUID EXTRACT.	Squibb.			Parke, Davis & Co.			Allaire, Woodward & Co.			J. Wyeth & Bro.			Pharmacopœia.		
	Sp. gr. of extract.	Sp. gr. of dest.	Vol. per cent. of abs. alc. × 2.	Sp. gr. of extract.	Sp. gr. of dest.	Vol. per cent. of abs. alc. × 2.	Sp. gr. of extract.	Sp. gr. of dest.	Vol. per cent. of abs. alc. × 2.	Sp. gr. of extract.	Sp. gr. of dest.	Vol. per cent. of abs. alc. × 2.	Sp. gr. of extract.	Sp. gr. of dest.	Vol. per cent. of abs. alc. × 2.
Belladonna root, . . .	1.035	.9720	48	0.958	.9680	56	1.000	.9697	52	1.002	.9714	50			
Digitalis, ...	0.937	.9607	64	1.001	.9776	37	1.054	.9762	40	0.988	.9659	60	1.064	.9745	43
Buchu, ...	0.894	.9524	80	0.862	.9474	86	0.965	.9681	56	0.937	.9597	70	0.893	.9532	79
Gelseminum, ...	1.009	.9814	31	0.953	.9695	48	0.902	.9595	70	0.944	.9628	65			
Cinchona, ...	1.062	.9705	50	0.981	.9757	41	1.007	.9757	41	1.022	.9781	36	1.094	.9814	30
Senega, ...	1.014	.9723	48	0.999	.9742	44	1.011	.9747	42	0.995	.9671	56	1.119	.9813	30
Ergot, ...	1.024	.9769	38	1.009	.9798	33	0.973	.9739	44	1.026	.9739	44	1.054	.9785	36
Ipecac, ...	0.978	.9728	46	0.988	.9804	32	1.006	.9769	38	0.997	.9728	46	1.141		
Wild Cherry, ...	1.129	.9880	18	0.932	.9614	67	0.999	.9739	44	1.090	.9950	07	1.092	.9893	16
Rhubarb, ...	1.100	.9728	46	1.005	.9696	53	0.996	.9694	53	1.026	.9700	52	1.074	.9700	52
Senna, ...	1.052	.9785	36	1.009	.9745	44	0.994	.9659	60	1.044	.9768	38	1.177	.9913	12
Valerian, ...	0.856	.9445	89	0.868	.9481	85	1.017	.9739	63	0.918	.9563	65	0.860	.9470	86

The extract of ergot, of Parke, Davis & Co., was designated on the label as "acetic," and that of wild cherry as "alcoholic."

The extracts of belladonna root and gelsemium were not made, the formula for the first being represented by digitalis, and for the latter by buchu.

The pharmacopœial extract of ipecac was not distilled, as it appears evident from the working formula that there is but a trifle, if any, alcohol present in the finished preparation.

FLUID EXTRACT OF HYDRASTIS CANADENSIS.*

BY CHARLES SPENZER, CLEVELAND, O.

The quality and alcoholic strength of some of these fluid extracts, as found in commerce, appear to vary, and for the purposes of examination I procured samples of different manufacture, which will be designated by figures 1 to 7. Sample No. 8 was made by myself by maceration, November, 1881, and No. 9 recently, according to the United States Pharmacopœia, 1873 (as a standard).

Estimation of Alcohol.—1. (*Distillation.*) The specific gravity is taken at 60° F., preferably in the specific gravity bottle, as some of the fluid extracts are heavier than water, in which case the alcoholometer can not be employed.

Fifty centicubes of the fluid extract are now introduced into a small retort, and a close-fitting receiver attached. The retort is then placed in a water-bath and 35 centicubes of the liquid distilled off. The distillate is then mixed with enough distilled water to make it measure 50 centicubes. The specific gravity is then taken at the same temperature as before, and the alcohol estimated by referring to a table on the specific gravities and percentages of alcohol in its various aqueous solutions.

2. (*Separation.*) Less accurately, by shaking 100 parts of the diluted distillate with warm exsiccated bicarbonate of potassium in a graduated glass tube. The bicarbonate must be added little by little until but a small portion remains undissolved. It acts by extracting the water from the solution and leaving the alcohol as a superficial stratum, which can be easily read off of the scale.

Determination of Solid Extract.—The residue of the retort is transferred to a weighed porcelain evaporating-dish and evaporated in a water-bath to a soft extract, and then allowed to stand over chloride of calcium, freshly-burnt quicklime, or any other desiccant, for a week or more, when a firm extract results.

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* Read at the Third Session.

Cane-sugar and Glucose.—By boiling 4 centicubes of the fluid extract, first with 1 drop of sulphuric acid and then 1 centicube of caustic potassa solution, and adding 2 or 3 drops of sulphate of copper solution. If glucose or cane-sugar are present, a reddish precipitate of cuprous oxide is formed. If the precipitate is not formed in fifteen minutes the fluid extract contains no glucose or cane-sugar.

Fluid extracts containing glycerin and no grape-sugar often give a precipitate, but it is scanty, and requires some time to form.

SCHEDULE.

	Sp. gr. Fluid extract.	Sp. gr. Diluted distillate.	Physical appearance of the fluid extract.	Amount of solid extract. Grains.	Per cent. of alcohol.	Glucose and cane sugar.
1	1.056	.940	Clear, dark-brown color.	231	39	None.
2	.9715	.935	Clear, red-brown color.	125½	42	Small amount.
3	1.1645	1.010	Clear, brown-yellow.	185½	none.	Large amount.
4	.9725	.960	Clear, brown-yellow.	100	29	None.
5	1.047	.940	Dark-brown with fine sediment.	211½	39	None.
6	.9545	.935	Dark-brown with granular sediment.	154½	42	Small amount.
7	.996	.945	Clear, dark-brown color.	210½	37	Large amount.
8	1.0485	.940	Clear, red-brown color.	215	39	None.
9	.973	.930	Red-brown color with granular sediment.	218	44	None.

ACTIVE DIASTASE IN EXTRACT OF MALT.*

BY ROBERT H. COWDREY.

To make the assertion that extract of malt could be so prepared that 1 pound would convert 1¼ pounds of raw starch into dextrin, grape-sugar, and glucose, would seem to be a very rash statement.

Such, however, seems to be the case, as I am prepared to show you, by taking 1¼ parts of starch and 1 part of malt, and after digesting them, apply the iodine test for starch without obtaining the blue color reaction, applying tests for sugar and dextrin, and finding both to be present; taking 5 drachms of starch and 10 ounces of water, they must be heated until the starch-crystals are gelatinized—as diastase has no action on ungelatinized starch—then allowed to cool down to 150°, and 4 drachms, by weight, of extract added. Almost immediately upon the addition of the malt, the thick starch-paste begins to be digested, as is shown by its becoming liquefied, and in a few moments will pour from the container like water; keeping up the temperature to 150° for thirty minutes, it is ready for the application of the iodine test, with its well-known blue color reaction if starch is present. We find that only the purple color, indicating dextrin, is shown. By precipitating this dextrin with an excess of alcohol and filtering, we find the filtrate remains colorless under the test. By the application of Fehling's solution the presence of sugar is shown.

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* Read at the Third Session.

Messrs. Dunstan & Dimmock, in their report in the "Pharmaceutical Journal," of March, 1879, say they find that 17.4 parts of malt are required to convert 1 part of starch, and remark: "It is well known that very small quantities of diastase will convert relatively large quantities of starch *into a fluid condition*, but that large quantities of diastase are necessary to effect the *entire conversion* of every trace of starch."

I have made extract of malt according to the formula of Liebig for some considerable time, and having taken great care in the preparation of it, I have regarded my own make as equal to any in the market. It was, therefore, with considerable surprise that I found the malt so prepared to be almost valueless in the conversion of starch.

Of all the brands in the market I have found but one that gave anything like satisfactory results, and that is the one I have used in making these experiments, a sample of which is herewith submitted.

The question naturally arises, why this difference in results?

In answer, I will say it must be remembered that different samples were used by Dunstan & Dimmock from those I have used; and as I am prepared to show you the same malt that now converts one and a quarter times its weight of starch, can, in a few moments, be made as inert as the others, by the application of heat to the boiling-point,—which, if I am correct, are the directions in Liebig's process,—the diastase is destroyed. And it will be seen, therefore, that constant care and attention are imperative in the manufacture of extract of malt,—for without it the best extract of malt may be rendered valueless by the destruction of the diastase, and without this active diastase, it is unnecessary to say that extracts of malt sink to the level of rich food, and nothing more.

UNGUENTUM HYDRARGYRI.*

BY EMLEN PAINTER, PH.G., SAN FRANCISCO.

THE above title having been the subject of very numerous short articles, which have appeared in pharmaceutical journals from time to time during the past few years, it would seem there is but little room for more light to be thrown upon it now; yet in the preparation of this ointment by hand, I venture to offer a few practical hints in the manipulation. At the same time I recognize the importance of the growing tendency of the times, to the division of labor, and that this preparation can be advantageously made by the obliging manufacturer by machinery.

Having had occasion to prepare several hundred pounds of mercurial ointment, and no suitable machinery available, led to my reviewing the many published articles on the subject, and giving the different methods proposed, practical tests. For a considerable time, however, I was unable to prepare more than 10 pounds a day,—with one man's labor, working very diligently,—whilst now, with my present mode of proceeding, I can as easily prepare from 40 to 50 pounds of ointment in a day.

The utensils required are: two spatulas (8 inches and 10 inches I find the most convenient sizes), a marble slab at least 2 feet square, a shallow iron dish of 1½ to 2 gallons capacity, and any suitable vessel for melting the fats required. Four or five pounds of mercury will be found the most convenient quantity to work upon in a single batch.

If the smaller quantity is taken, add to it, in the dish, 4 ounces of any limpid fixed oil (mustard-seed oil answers admirably), and with one of the spatulas stir until the mercury is uniformly divided into small globules, which will take five minutes' time or less; next add 4 ounces of tallow, or if the tallow is too hard, take a mixture of tallow and lard (containing about 20 per cent. of the latter), melted together, but allowed to get entirely cold before using; with the spatulas break down the lumps of fat, and rub all together in the dish until uniformly mixed. Should a portion of the mercury separate on rubbing in the hard fat, a little persistence in stirring will again divide it as before.

The mixture will now present a somewhat granular appearance, and the globules of mercury, though small, will be easily discernible. Next remove it to the marble slab, and with the two spatulas, one in either hand, rub alternately, one hand relieving the other, so as to avoid getting the muscles of the hand and arm too tired. Rub loosely at first, or else the globules of mercury will run together, but as they are reduced in size, it can be rubbed closer to the slab and with more pressure. A little tincture of benzoin can now be added to advantage; it will serve a double purpose of aiding in the division of the globules, and preserving the ointment from rancidity. In divided portions then continue rubbing with the spatulas until globules of mercury are no longer visible, after which return it to the iron dish, add 8 ounces more of oil, stir together, and then add a mixture of equal parts of tallow and lard, melted together, and in a limpid state (160° to 180° F.), sufficient to make 8 pounds in all. Stir continuously until the whole stiffens, frequently scraping from the bottom and sides of the dish.

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* Read at the Second Session.

Again remove the ointment to the marble slab, and rub it in divided portions to insure a uniform mixture, and the division of any stray globules of mercury. The result is a dark-colored smooth ointment, if pains are taken to carry out the details. It is of importance to have the melted fat neither too hot nor too cold; in either case the ointment is apt to be granular, to require a great deal more rubbing, and the finished product will be much lighter in color, and otherwise not so satisfactory.

I do not claim novelty for the whole of my process for making mercurial ointment; it is mainly mere modifications of the suggestions of different writers, which, in my experience, results in saving much labor, the chief point being, in completely "extinguishing" the mercury with the least practical quantity of fat, when it can afterwards be mixed with any required amount in a melted state without much trouble, and the ointment does not separate after it is cold. If, however, warm fat is used in the first instance, before the mercury is thoroughly divided, globules will separate when rubbed, or even cut with a spatula after becoming entirely cold.

ON COMMERCIAL MERCURIAL OINTMENT.*

BY GEORGE W. KENNEDY.

QUERY 25.—What is the strength of commercial mercurial ointment?

In replying to the above query, before giving the results obtained, I desire to call the attention of members to the manner in which I found some pharmacists keep and dispense blue ointment. I was much surprised to find a number of druggists who keep and sell the ointment of so many grades of strength, pretending to contain from twenty-five to fifty per cent. of mercury. I ascertained the kind generally sold is that containing one-third mercury. It appears that those who sell this grade, as a rule, make no pretensions of concealment, but sell it openly as an article below that of the Pharmacopœia strength. In some stores, where you call for a box of the ointment, you are asked the question by the proprietor or clerk which kind you want, the strong or the weak? Then, again, there are those who ask no questions, but give you what they consider mercurial ointment, which may contain 20, 25, 30, 40, or 50 per cent. of mercury.

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* Read at the Second Session.

I presume, in many instances, the dilutions are made for no other purpose than to cheapen the article, so that the dealer can furnish a larger quantity for the same amount of money than the honest and conscientious man, and in a pecuniary point the former would come out ahead.

As to its preservation I found little, if any, attention given by a few pharmacists. In one jar examined I found the mercury had almost entirely separated. The ointment consisted of three layers. First, or top layer, was a heavy crust of fat; the second of a soft bluish color, and beneath this were numerous small globules of bright mercury, which constituted the third or lower layer. Another sample was wrapped up loosely in a bladder. The greater portion of the ointment was exposed to the damp atmosphere of a cellar, and with difficulty penetrated by a spatula. The condition of this salve was such as to indicate considerable carelessness and indolence on the part of the druggist, as the ointment was oxidized to a depth of several inches. Then, again, I found it in jars, without covers, in a dreadful state, covered with dust and dirt, and had the appearance of an ointment which had not been dispensed for weeks.

Most of the ointments examined were not in the condition as above-described, but were well taken care of. In returning to the query, I would state that I examined, in all, fifteen samples, twelve of which were purchased from as many retail stores, the other three from wholesale houses. The percentage of mercury was determined in two ways, the results in both cases agreeing. First, the fat of the ointment was dissolved in ether, in a tall test-tube. The mercury soon collected in the bottom of the tube, and after repeating the treatment five or six times, or until all traces of fat have been removed, the last traces of ether may, by a moderate heat, be readily evaporated from the sediment, which is then weighed and the amount of mercury present obtained. 100 grains of the ointment were used in this experiment.

The second process is that of C. Thein (see Amer. Jour. of Pharm., 1882, p. 309) which is decidedly a very simple and rational one. 100 grains of ointment are placed into a warm narrow test-tube, so as to bring it to bottom. Add 3 grams of magnesia sulphate (or other neutral salt) and nearly fill with water; heat until the fat is *clear;* then cool, inserting a match or splinter of wood in the fat. When the fat is solid warm slightly the sides of the test-tube; lift out the fat; remove the wood and weigh; decant the water; wash the test-tube well with chloroform, or ether, or benzin; evaporate and weigh the last portions of fat, then weigh the mercury left behind.

The results are as follows:

No.	Obtained from	Amount of Mercury.
1.	Retail store, . .	26 per cent.
2.	" " . . .	34 "
3.	" " . . .	20 "
4.	" " . . .	32 "
5.	" " . . .	38 "
6.	" " . . .	50 "
7.	" " . . .	40 "
8.	" " . . .	31 "
9.	Retail store, .	24½ per cent.
10.	" " .	21½ "
11.	" " .	31¾ "
12.	" " .	22 "
13.	Wholesale store. .	46 "
14.	" " .	41¼ "
15.	" " .	48 "

The mercury obtained, according to the above figures, was not altogether free from oxide, as several of the samples examined contained from one-half to two per cent. of the oxidized metal, which was got rid of by digesting in strong acetic acid.

ON BORACIC ACID, ITS PREPARATIONS AND USES.[*]

BY EDMUND DANA, JR., OF PORTLAND, MAINE.

One object in presenting this paper to the Association is on account of so little being known of this substance. It is not even mentioned in any of the older text-books, and but briefly noticed in few of the modern ones. Its preservative action is alone mentioned in any of the published proceedings of our Association. (Page 229 of Proceedings for 1880.)

Dr. Just. Lucas Champonniere's work on "Antiseptic Surgery," published in France in 1880, and translated in 1881, by Frederick Henry Gerrish, Surgeon to the Maine General Hospital, Portland, Maine, contains several formulas in which boracic acid is the antiseptic agent, and is indorsed by the above-named gentleman as rendering "capital service as a dressing." The chemistry of it is referred to in an address delivered at St. Thomas Hospital, 1881, by William Maccormac, Surgeon of St. Thomas Hospital, in which he states "boracic acid is an excellent antiseptic application. These are the only two modern works in which the substance is even mentioned, and this little that has been written of it has not attracted general or marked attention, so I think I am perhaps warranted in saying of the large majority of the members of our Association, that they have no familiar or practical acquaintance with this important therapeutic agent.

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[*] Read at the Fourth Session.

One other reason is that Lister's formula for boracic ointment has been recommended for adoption in the revision of the Pharmacopœia. Another is, to bring before this Association an article of great value as a preservative agent, and for its beneficial action as a topical remedy in ulcerated surfaces, eczema, and skin diseases.

The late Warren W. Greene, an eminent surgeon, first called my attention to it in 1880, and it was at his suggestion that a series of experiments were conducted at my pharmacy, the resulting formulas of which I submit with this paper. They were adopted by him and at the hospital with marked success, in the treatment of cases needing antiseptic dressing. For these reasons I submit this paper and accompanying formulas, for such action as you may choose to give.

"Boracic acid, H_3BO_3, is found in volcanic regions in various parts of the world, in borax or borate of soda; a substance used by the ancient Arabians." Boracic acid is a white crystalline non-volatile substance, quite bland, unirritating in solution, and not poisonous. It is odorless and almost tasteless, and gives colorless solutions. It is often obtained by decomposing the borate of soda with sulphuric acid. The supply is therefore abundant, and its manufacture inexpensive. It is peculiar as to solubility. Cold water and alcohol dissolves and holds in solution only 18 grains to the fluid ounce. Hot water dissolves 80 grains to the fluid ounce of water, but on cooling precipitates all but 18 grains. Hot glycerin, however, dissolves 180 grains to the fluid ounce, and holds it perfectly on cooling. It is not soluble in vaseline, paraffin, wax, oil or spermaceti.

In making the statements in regard to the solubility of boracic acid, I am aware that a public statement has been made, giving a much larger quantity of boracic acid being held in permanent solution than I have given. I do not understand how such a statement could be made; it is certainly a mistaken one.

The experiments I made very carefully and extended over a period of time, with a view to see how much boracic acid could be held in a permanent cold solution of water, glycerin, vaseline, etc., and I know I am right in making the above statements, and they are sufficient for practical use.

Vaseline, cold or hot, does not affect it, but at a high temperature unites readily with the boracic glycerite, and the union remains permanent on cooling. Boracic acid is a curious substance. Water added to the glycerite will precipitate the acid. As I have said before, vaseline does not dissolve it, but by adding the glycerite of boracic acid to hot vaseline, and on cooling by proper trituration, it unites perfectly with the glycerite and forms a perfect union, and unlike the ointment made by Lister's formula, is free from all irritating particles of undissolved acid. Lister's boracic acid ointment is simply a mechanical mixture, and the particles of undissolved acid must act as an irritant on ulcerated and inflamed surfaces, while in the formulas I submit with this paper you have an odorless, antiseptic, perfectly bland, in itself a most grateful and wholesome protective dressing. It is staple under all ordinary temperatures, is not affected by morbid secretions, never becomes rancid, or changed in density by age or exposure.

The application of any of the formulas may be made by saturated compresses, with protective dressing.

Solution of Boracic Acid.—Acid boracic, grains xviij; aqua, f℥i. Dissolve by heat.

Glycerite of Boracic Acid.—Acid boracic, ʒiij; glycerin, f℥i. Dissolve the acid in the glycerin, suspended in a hot-water bath, until dissolved.

Unguentum Acidi Boracici.—Glycerite acid boracic, f℥ij; ceræ albæ, ℥ij; vaselini, ℥xij. Melt the wax and vaseline together, and while *hot* add the glycerite slowly, with constant stirring while cooling.

This ointment makes a dressing of ordinary strength, and is a fine pharmaceutical preparation. The strength can be increased if desired by adding a larger proportion of the glycerite.

Dr. Green says under such a dressing as this ointment, which never adheres to the raw surface, "granulations prosper, skin-grafts thrive, bad odors cease, and pain and irritation rapidly diminish." As a dressing for fresh wounds, as well as in sores of an unhealthy character; in a variety of skin diseases, and various forms of tinea, the use of the acid has been uniformly either curative or markedly palliative or beneficial.

In submitting this paper to the Association I have the good of mankind in view, as well as the advancement of pharmacy; and if you think these formulas are worthy a place in your Proceedings my object in submitting this paper will have been accomplished, and many irritating surfaces benefited thereby.

II. CHEMISTRY.

ON THE PREPARATION OF PHOSPHORIC ACID BY THE OXIDATION OF PHOSPHORUS WITH ATMOSPHERIC AIR IN THE PRESENCE OF MOISTURE.*

BY W. T. WENZELL, PH.G., M.D., PROFESSOR OF CHEMISTRY IN THE CALIFORNIA COLLEGE OF PHARMACY.

A PRELIMINARY paper announcing some experiments and results favorable to the preparation of phosphoric acid by moist oxidation was read at a quarterly meeting of the California Pharmaceutical Society held in July, 1882.

Since then further experiments were made with the view of devising a process by which the principles here involved could be carried out in a practical way and free from danger. That phosphoric acid might be prepared easily and in any quantity by this process was suggested by the following incident:

A common ointment-jar, containing a half pound of phosphorus (the sticks were in a vertical position, immersed in water), loosely covered, was kept in a basement, where the temperature usually varies between 58° and 65° F. On taking off the cover, at the expiration of four months, it was noticed that not only two thirds of the water had evaporated during that time, but that a relative quantity of the phosphorus had also disappeared, the upper ends of the sticks presenting the appearance of being, as it were, smoothly cut to the level of the water. The liquid was not only very acid, but was also very dense, of a somewhat oily consistence.

That phosphoric and phosphorous acids are produced by the oxidation of phosphorus in moist air is certainly not new, but I could not find in the various standard works on chemistry I then consulted that this process had ever been applied or recommended as a method for the production of phosphoric acid. It was only of late, and after the completion of my experiments, that I happened to find, in Mohr's "Commentary to the Prussian Pharmacopœia for 1850," mention that phosphoric acid might be made by a process of slow oxidation in air. F. Mohr recommended to have a stick of phosphorus put into a glass tube narrowed at one end; to have a number of such tubes laid into a glass or porcelain funnel, the end of which (the funnel) dipping into a flask containing water. The phosphorus oxidized, as was stated, very slowly, emitting a luminous vapor, which gave out an odor resembling that usually observed when sparks from a powerful electrical machine are passed through air (ozone). Mohr admitted that it was rather slow as to results. He mentions, also, a process recommended by Doebereiner, which directs to put into the bottom of a flat porcelain dish pounded glass to the depth of one inch, to cover the pounded glass nearly with water, and lay thereon any suitable number of phosphorus sticks, taking care to prevent their touching each other; the whole to be covered with a bell-glass. Oxidation by this process is stated to be more rapid than that of Mohr's.

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* Read at the Fourth Session.

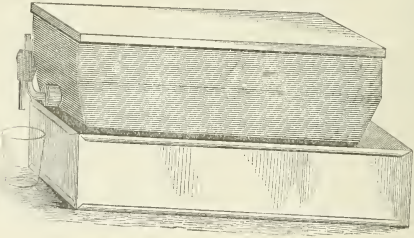
That neither of the two methods have found favor is no doubt owing to their impracticability and the highly probable risk of dangerous combustion, as no provision was recommended to regulate the supply of air.

I have found that a simple arrangement for the aerial oxidation is had in an ordinary infusion-jar. A pint jar, holding seven fluid ounces up to the perforated diaphragm, will answer for 360 grains of phosphorus (the officinal quantity); a quart jar, holding ten fluid ounces to diaphragm, will be suitable for 720 grains. The phosphorus in the form of sticks is laid upon the diaphragm, a sufficient quantity of water is poured into the jar to immerse the sticks to about half of their diameter, and the lip of the jar closed by pasting paper over its mouth or inserting a rubber cork. The top of the jar having previously been ground true and smooth was then covered with a porous disk of plaster of paris, about one-eighth of an inch thick.

The jar, having been thus prepared, oxidation of the phosphorus will commence at once, and will continue regularly, requiring no attention until after the expiration of one week. At this time the phosphorus will be found to have disappeared to the surface of the water. It will now be necessary to pour off a portion of the acid liquid in order to expose the lower half of the phosphorus to the influence of moist oxidation, taking care to replace the porous disk. During the course of the second week the acid fluid may require to be poured off more than once, owing to an increase in its volume.

To prepare a larger quantity of the acid, a leaden tray was provided and so constructed as to make the process more automatic in its effects. This arrangement is capable of oxidizing 8 ounces of phosphorus, measured in the clear, 9 inches in length, 5 inches in width, and 3 inches in depth. On the inner sides, about 1½ inches from the bottom, a narrow shelf gave support to a grating of sheet-lead, having eight narrow slits, cut transversely, on which the phosphorus sticks were laid with about half an inch space between. The upper edge of the tray was smoothed to fit a porous cover of plaster of Paris, having a thickness of half an inch. Into one of the end sides of the apparatus, as near as possible to the bottom, a round hole was provided, and a rubber cork inserted, through which a glass tube was passed bent at a right angle, the bent limb being just of a length to reach accurately the leaden grating, when the latter was placed *in situ* within the tray. Attached to the limb of the tube, and parallel to it, another glass tube was cemented, the upper end on a level with the limb of the bent tube, and extending about half an inch below the bend of the other tube. The apparatus being thus arranged, the bent end of the tube was stopped with a well-fitting plug, the phosphorus laid upon the slits of the grating, and a sufficiency of water poured into the tray to half immerse the sticks, and the apparatus finally covered with the plaster of Paris tile, which should fit the top of the tray sufficiently close as not to allow any fumes to escape.

Fig. 67.



Apparatus for Preparing Phosphoric Acid.

In about a week, the cover may be lifted, when, if the phosphorus is nearly, or entirely reduced to the level of the liquid, the plug may be removed, and the acid fluid allowed to drain into a suitable receiver, without changing the position of the apparatus. Then replace the porous tile, and if the upper extremity of the bent tube has been so adjusted so that the level of the liquid in the tray will just about touch the lower segments of the phosphorus sticks. the final oxidation will be, from this on, entirely automatic, and no further attention is necessary until the phosphorus is consumed. For, from this stage of the process, on to the end, there will be a continual augmentation in volume of the acid fluid. It is by means of the bent tube that the surplus is drained off, and thus the acid liquid in the tray kept at the same level. When the process is completed, the acid solution may be drawn off by turning the bent limb of the glass tube down.

The leaden tray was used only on an experimental basis, and is not to be recommended, inasmuch as a certain amount of lead phosphate is unavoidably formed, which is sufficiently soluble in the acid fluid to contaminate it. An apparatus made of white pottery, glazed to resist acids, is no doubt the best. A tray and grating made of gutta-percha may possibly answer.

The products of the moist aerial oxidation of phosphorus, are known as follows:

Phosphoric acid, H_3PO_4,
Phosphorous acid, H_3PO_3,
Ozone, O_3,
Hydrogen peroxide, H_2O_2,
Ammonium nitrate, NH_4NO_3.

Phosphoric acid is produced by far in the largest proportion; next in importance as to quantity will be found phosphorous acid; then ozone and hydrogen peroxide are formed, according to the elaborate investigations of Professor Leeds, in equal molecular proportions. Ammonium nitrate, a concomitant of this process, is produced in small quantities.

During the oxidation of phosphorus in the presence of moisture, a white vapor is always given off. This mist, or white cloud, was at one time supposed to consist of a mixture of the vapors from phosphorus and phosphorous acid. Schoenbein, the discoverer of ozone, assumed that the vapor consisted of monatomic oxygen, or antozone, as he called it. It was only of late that its true nature has been ascertained and demonstrated by the classical researches of von Babo, and Nasse and Engler, who furnished conclusive proof that the antozone of Schoenbein is nothing more than hydrogen peroxide, in a state of vesicular suspension; a condition resembling a mist, only that it is more durable, and will continue to exist in this state for some time, even after the vapor of water, with which it is associated, has been completely removed.

The following is the probable rationale of this process of oxidation taken from the "Journal of the American Chemical Society," vol. iii, p. 6, "On the Ozonization of Air by Moist Phosphorus;" by Professor Albert R. Leeds.

(1.) $P_4 + O_{14} = P_2O_5 + P_2O_3 + 2O_2 + O + O$.
(2.) $O_2 + O = O_3$.
(3.) $H_2O + O = H_2O_2$.
(4.) $N_2 + 2H_2O + O = NH_4NO_3$.

On viewing the above equations, it will be seen that by this method of oxidation ozone and hydrogen peroxide are important products; that they are formed, as it appears, simultaneously, and independent of each other. Of this there can be no question, since it has been shown that ozone is not capable of changing the water molecule into hydrogen peroxide. The only sufficiently assignable cause of the formation of these two substances can be found on theoretical grounds, in the quantivalence of the respective phosphorus and oxygen atoms. It necessitates the splitting of the diatomic or ordinary oxygen molecules, in order to supply the phosphorus atoms with the uneven number of oxygen atoms to form phosphoric and phosphorous oxides. It is hence easily conceived that monatomic oxygen, or oxygen at the moment of its liberation from the ordinary oxygen molecule, would become active oxygen, and as such would be capable of oxidizing an oxygen molecule to ozone, a water molecule into hydrogen peroxide, and finally a nitrogen molecule in the presence of water to ammonium nitrate. The porous covering of our apparatus not only allows the gradual admission of atmospheric oxygen to the interior, but it also permits the dialyzation of ozone from hydrogen peroxide. The former is given off by diffusion through the porous septum into the atmosphere, whilst the latter is retained within, dissolved by the acid fluid, and there either serves to oxidize a part of the phosphorous acid into phosphoric, or takes a part in the direct oxidation.

That hydrogen peroxide is absorbed and present in the acid solution, is demonstrated by shaking together a portion of it with anhydrous ether, and a drop of a solution of chromic acid, when the ether will at once acquire a blue color from the perchromic acid formed.

That ozone is given off from the porous covering freely and abundantly, may be shown by its peculiar odor and the color-reaction upon a slightly moistened ozone test-paper (Schoenbein's). As has been stated, the acid solution is composed of a variable mixture of phosphoric and phosphorous acids; but it generally contains also in addition a certain quantity of arsenic, which, in order to make a correctly pharmaceutical product, will necessitate its removal; and, further, the phosphorous acid should be converted into phosphoric acid. To effect the former, the acid solution is evaporated in a Berlin or Meissen dish, until a thermometer placed in it will indicate a temperature of 160° C. At this temperature the acid liquid will become turbid, and deposits the arsenic in the metallic state as a brownish-black substance, and if this heat is maintained a short time, all of the existing arsenic in the liquid will be completely precipitated, the supernatant becoming clear and colorless.

That arsenic may separate from a heated phosphoric acid solution has been shown by E. A. Schreck, in a paper on "Dilute Phosphoric Acid," published in the "Proceedings" of the California Pharmaceutical Society for 1889.

He found a separation of arsenic to occur when the temperature was inadvertently allowed to go far above 400° F. (204° C.), a point at which the acid was found to act strongly on the dish. The removal of arsenic at 160° C. (320° F.) is complete, and it is not unimportant to consider that neither this temperature nor the concentration of the acid is sufficient to affect Berlin or Meissen ware materially. (The specific gravity of the acid at this degree of concentration is 1.75.) If, however, the heat be allowed to reach 170° C. and beyond it, the phosphorous acid will resolve itself into phosphoric acid and spontaneously inflammable hydrogen phosphide, which, as it is given off, will burn vividly with a snapping noise.

$$4H_3PO_3 = 3H_3PO_4 + H_3P.$$

The arsenic probably exists in the acid liquid as arsenic acid, as it is well known that hydrogen peroxide is capable of oxidizing arsenious acid into arsenic. The reduction of arsenic acid to metallic arsenic may be formulated to the following equation:

$$5H_3PO_3 + 2H_3AsO_4 = 5H_3PO_4 + 3H_2O + As_2.$$

The acid solution is next to be diluted and filtered preparatory to the oxidation of the phosphorous acid into phosphoric. The filtrate is evaporated until the thermometer indicates 120° to 130° C. At this temperature the oxidation is easily effected by means of nitric acid, the usual nitrous vapors being given off. The amount of nitric acid sp. gr. 1.38 required for the completion of an acid solution obtained from 360 grains of phosphorus varies from 2 to 5 drachms. (To oxidize the same quantity of phosphorus requires, by the officinal process, 5 troy ounces of acid of sp. gr. 1.40.) By adding the nitric acid until nitrous vapors cease to be given off, an excess of the acid will unavoidably remain, and will require prolonged heating and a high temperature until it is all dissipated. In order to avoid this trouble, in some part of the process, a slight change was made in the mode of procedure by reserving a portion of the acid fluid for the purpose of getting rid of the excess of nitric acid, and thus dispense with the final heating. I have found that, by reserving about one-tenth of the solution, an amount usually in excess of what is actually required, the desired end is easily accomplished. The oxidation is conducted in the usual way, the nitric acid being added in small portions at a time, until the liquid acquires a yellowish tinge and the effervescence from the escape of nitrous vapor has almost ceased. The reserved portion is now to be added gradually, when, in due time, a point will be reached when the yellow color of the liquid is replaced by a bluish-green, which, gradually fading, ultimately becomes colorless. Should any of the reserved liquid be left it may be added in small portions, each of which may also be oxidized by the cautious addition of a few drops of nitric acid. A valuable guide for determining the end-reaction will also be found in noticing the gas-bubbles as they form and break on the surface. If they contain colored nitrous vapors, more of the reserved liquid should be added; and if, on the other hand, the bubbles are filled with a colorless gas (nitrous oxide), the oxidation may be assumed as practically completed. A minimum excess of phosphorous acid is rather desirable, as it insures the absence of nitric acid, and it will become, in time, converted into phosphoric acid by absorption of oxygen from the atmosphere.

The phosphorous acid may also be oxidized in a flask of from 8 to 10 times the volume of the acid fluid. This method has the advantage that but a very small quantity of nitrous fumes will escape during the process if the flask is sufficiently large, the nitric peroxide being utilized in the oxidation. This process will hence require a still smaller quantity of nitric acid. The operation is also accomplished with less annoyance to the operator on account of the small amount of nitrous fumes given off into the air from the flask. The reactions taking place within the flask may be formulated as follows:

$$(1) \qquad 2H_3PO_3 + 2HNO_3 = 2H_3PO_4 + H_2O + N_2O_2.$$

$$(2) \qquad N_2O_2 + O = N_2O_4.$$

$$(3) \qquad N_2O_4 + H_2O = HNO_3 + HNO_2.$$

$$(4) \qquad \begin{cases} 2HNO_3 + 2H_3PO_3 = 2H_3PO_4 + H_2O + N_2O_2. \\ 2HNO_2 + 2H_3PO_3 = 2H_3PO_4 + H_2O + N_2O. \end{cases}$$

The liberated nitric oxide, a product of the first reaction, on coming in contact with atmospheric air which enters the open flask, is there converted into nitric peroxide, and, on being dissolved in the aqueous vapor filling the flask, gives rise to the production of nitric and nitrous acid as shown in third reaction. These acid vapors, condensing on the cooler sides of the flask, flow back into the liquid, causing further oxidation, nitric oxide being again disengaged, as exemplified in the fourth reactions, the final product being nitrous oxide, which escapes. Unquestionably nitric peroxide acts here in a nearly similar manner in promoting oxidation as it does in the conversion of sulphurous oxide into sulphuric in the manufacture of sulphuric acid, nitrogen dioxide being simply a carrier of oxygen.

In using the flask process care should be taken to adjust the amount of nitric acid at a time to the size of the flask, or the amount of nitrous fumes produced should not be formed in such quantity as to cause any considerable escape. Again, no further addition of nitric acid should be made until the nitric peroxide is first absorbed and the interior of the flask above the acid liquid rendered nearly colorless. The mode of conducting the final oxidation by means of a reserved portion may also be used here, and also the manner of ascertaining the end-reaction. Should, however, any doubt be entertained as to the absence of nitric acid, its presence is readily detected by moistening a fragment of crystallized ferrous sulphate with a little of the acid fluid by means of a glass rod, producing the well-known dark-brown coloration.

This method is, as a matter of course, somewhat tedious, particularly if the quantity of acid to be made is considerable. Its advantages can only be said to outweigh the trouble if the officinal quantity or its double is to be made and no conveniences are to be had for carrying off the nitrous vapors.

ON COMMERCIAL BISMUTH AND BISMUTH SALTS.*

BY PROFESSOR P. W. BEDFORD.

QUERY 15.—How do the commercial bismuth preparations compare with the requirements of the United States Pharmacopœia?

At the time this query was accepted (as even now) the United States Pharmacopœia of 1870 was the guide by which this query should be replied. The writer has, however, made his experiments in the light of the more exact and definite tests of the Pharmacopœia of 1880.

The samples of bismuth examined were from Powers & Weightman, Rosengarten & Sons, E. R. Squibb, C. T. White & Co., C. Pfizer & Co., and Mallinckrodt & Co., and were the two salts almost exclusively used; the subnitrate and subcarbonate. The impurities sought for were lead, copper, silver, arsenic, alkaline earths, ammonia, chlorine, sulphuric acid.

Besides the salts, the writer examined specimens of metallic bismuth, one sample being from the new Australian source.

As the examination was so thoroughly satisfactory as to the medicinal quality, no enumeration will be made as to the results of the examination of each individual maker, but the results may be embodied in a general statement. This may be stated as follows: That each of the samples of subnitrate and subcarbonate of bismuth examined are fully equal to the requirements of the Pharmacopœia of 1880, that in none of the specimens examined is there any lead, copper, silver, chlorine, or sulphuric acid. By a more rigid test than the United States Pharmacopœia exacts, there were traces of ammonia in two samples; in all there were traces of alkaline earths or salts, both due, undoubtedly, to imperfect washing of the precipitates in process of manufacture, yet in both the quantities were so minute that they were practically not noticeable in an analysis beyond "a trace."

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* Read at the Third Session.

The same may be said about arsenic, though in this a quantitative determination was made. The amounts present of arsenic varied from less than $\frac{4}{10}$ grain to 3 grains in one thousand grains.

The specimen of Australian bismuth gave evidences of a trace of copper and arsenic, but neither were estimated.

ON THE SOLUBILITY OF CHEMICALS IN ALCOHOL.*

BY P. C. CANDIDUS.

QUERY 10.—It is desired to ascertain the solubility of the officinal chemicals in alcohol of the specific gravity 0.941 at 15.5° C. = 60° F. and at its boiling-point. The method of examination should be stated.

IN answer to the above query I would state that the solubility of the chemicals was first ascertained at 15.5° C. = 60° F. The menstruum was kept in a flask at the required temperature, then the required quantity weighed in a test-tube and a weighed portion of chemical gradually added, the test-tube shaken until no more would dissolve, then brought to 15.5° C. = 60° F. If there was an undissolved portion the largest part of the liquid was poured off and the balance filtered through a small weighed filter, which was afterwards dried in a drying oven, and then weighed and deducted from the weight of the chemical first used. This then was compared with the menstruum, and the proportion of solubility obtained. The experiments made at the boiling-point presented an easier method, because those made at 15.5° C. served as a guide to a certain extent. The required quantity of menstruum was weighed into the test-tubes, then heated to the boiling-point by means of a water-bath, as much chemical added in several portions as would dissolve, the boiling-point being maintained.

Name of Chemical.	15.5° C. = 60° F.	Boiling-point.
Acidum Benzoicum, ...	1 — 10	0.9 — 1
" Citricum, ...	1.6 — 1	1.9 — 1
" Gallicum, ...	1 — 9	0.48 — 1
" Oxalicum, ...	1 — 5.8	0.7 — 1
" Pyrogallicum, . . .	1 — 1.25	indefinite.
" Salicylicum, . . .	1 — 20	1 — 1
" Tannicum, ...	1.3 — 1	indefinite.
" Tartaricum, ...	1 — 1.33	1 — 1
Ammonii Benzoas, ...	1 — 5.5	1 — 2.14
" Bromidum, . . .	1 — 3.25	1 — 2

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* Read at the Second Session.

Name of Chemical.	15.5° C. _ 60° F.	Boiling-point.
Ammonii Carbonas,	1 — 5.5	0 — 0
" Chloridum,	1 — 6.5	1 — 4.5
Argenti Nitras,	1 — 2.7	1 — 1
Antimonii et Potassii Tartras,		sparingly.
Aluminii et Potassii Sulphas,	sparingly.	1 — 5
Alumen Exsiccatum,	"	1 — 6
Beberiæ Sulphas,	1.25 — 1	indefinite.
Cadmii Bromidum,	1 — 4	1 — 3
Cupri Sulphas,	1 — 30	1 — 17
Ferri Sulphas,	1 — 20	1 — 6.66
Hydrargyri Chloridum Corrosivum,	1 — 7.5	1 — 3
Iodoformum,	1 — 240	1 — 120
Iodum,	1 — 2.66	volatile.
Magnesii Sulphas,	1 — 20	1 — 7.5
Morphiæ Murias,	1 — 48	1 — 1
Morphiæ Sulphas,	1 — 40	1 — 1.1
Plumbi Acetas,	1 — 15	uncertain.
Potassii Acetas,	2 — 1	3 17 — 1
" Bromidum,	1 — 7	1 — 3
" Bicarbonas,	1 — 24	1 — 10
" Iodidum,	1 — 2.5	1 — 1.17
" Chloras,	1 — 80	1 — 8.5
" Nitras,	1 — 120	1 — 2
" Sulphas,	not soluble.	sparingly.
Quiniæ Bisulphas,	1 — 26	less than its own weight.
" Sulphas,	1 — 240	1 — 3.5
Sodii Bicarbonas,	1 — 120	1 — 40
" Bromidum,	1 — 2.40	1 — 1.6
" Chloridum,	1 — 13.33	1 — 10
" Salicylas,	1 — 1.5	1 — 1
Zinci Acetas,	1 — 12	1 — 1.1
" Sulphas,	1 — 24	dissolves to 2 different strata.

III. MATERIA MEDICA.

ON THE GERMINATION OF SEEDS OF MEDICINAL PLANTS.*

BY WILLIAM SAUNDERS, LONDON, ONT.

QUERY 12.—It has been asserted that much difficulty has been experienced in cultivating some species of medicinal plants, owing to the failure of the seed to germinate. Would any special treatment of such seeds facilitate their germination?

IN endeavoring to prepare a reply to the above query I have met much difficulty, partly from want of time to carry on an extensive series of experiments, and also in failing to procure fresh seeds of medicinal plants for this purpose, and I fear that any facts I have thus far been enabled to accumulate will be but an imperfect and partial reply. The results given are from records extending over a period of several years, and most of the seeds referred to were necessarily procured through the ordinary channels of commerce, and from such a source failure may often be reasonably attributed to the unknown age of the seeds obtained.

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* Read at the Third Session.

Aconitum Napellus.—Seed sown in an open bed, early in spring; none germinated.

Agrimonia officinalis.—Similarly treated; no results.

Anchusa Italica.—The seeds of this plant came up thickly and survived for several winters without protection.

Anethum graveolens.—A few of the seeds germinated, but only a very small proportion of the whole. Some of the plants matured seed in the autumn.

Angelica Archangelica.—A quantity of seed of this plant was sown, but none germinated.

Artemisia Absinthium.—This seed germinated freely, producing a fine crop of vigorous plants, which continue to yield a quantity of the leaves every season.

Asclepias tuberosa.—This seed, although the plant is in many places common, I was unable to procure in this country. I obtained some from France, but it failed to grow.

Atropa Belladonna.—A large proportion of the seed of this plant germinated, the plants filling a good-sized bed before autumn.

Berberis vulgaris.—This seed when freshly obtained from the berries by pounding and washing to free it from pulp will usually germinate without difficulty.

Bryonia alba.—Seed of this plant, imported from Europe, failed to grow.

Calendula officinalis.—This has been tried on several occasions, the seed germinating in good proportion.

Colchicum Autumnale.—Seed has been several times sown, but without result.

Coriandrum sativum.—This seed was said to be that of the previous year's crop; it germinated well, producing thick rows of young plants, among which, as they grew larger, many became weakly and died for want of sufficient space to develop in. The plant is a rank grower, and the odor from it very unpleasant. The seed, when matured, was good and abundant.

Digitalis purpurea.—These exceedingly small seeds germinated well, producing good plants by the end of the season, which survived the winter, with little or no protection, and flowered and fruited during the following season.

Gentiana lutea.—This seed failed entirely.

Glycyrrhiza glabra.—A few of these seeds grew and made fair-sized plants by the autumn, but they were destroyed by the cold of the succeeding winter.

Hyoscyamus niger.—A small proportion of the seed sown germinated and produced healthy plants, some of them of the annual variety, others of the biennial.

Hyssopus officinalis.—The seed of this plant grew well and produced an abundant crop, which has sustained itself for several years and endured the severity of our winters without injury.

Lobelia inflata.—Seed has been sown on several occasions, but in no instance has a single plant been obtained.

Marrubium vulgare.—Seed of this plant also failed to grow.

Phytolacca decandra.—The seed after being washed free from the pulp, in which it is inclosed in the berry, germinated in fair proportion and produced vigorous plants.

Polygala Senega.—Small quantities of this seed have been obtained on several occasions, but in no instance have I succeeded in growing any plants.

Ruta graveolens.—Seed of this plant germinated freely and produced a fine crop.

Salvia officinalis.—Fresh seed of this plant is easily obtained, and as a rule, grows freely, producing excellent crops.

Sarothamnus Scoparius.—Imported seed of this plant germinated well and produced a large number of strong plants.

Solanum dulcamara.—Seed of this shrub procured, from what I believed to be a good source, failed to grow.

Tanacetum vulgare.—This seed grew well and yielded an abundant harvest.

Taraxacum dens-leonis.—Clean seed of this plant, imported from France, germinated well and produced a good crop, the roots attaining a fair marketable size by the end of the summer.

Valeriana officinalis.—Imported seed of this plant failed to grow.

Veratrum album.—Seed of this also entirely failed.

From the few experiments I have been able to make, I am of opinion that most of the failures may be attributed to the fact of the seeds being old and dry, and that if the seed after being allowed to ripen is obtained fresh from the plant and sown in mellow soil in shallow drills, that in most instances success will attend the effort. In sowing the seed should not be planted in the soil much deeper than twice its own length, and in the case of very small seeds they should be sown on the surface as soon as possible after they are ripe, and lightly raked in. If the seeds are thus prevented from drying, and are not covered too deeply, they will usually germinate either in the autumn or the following spring. Seeds having thick integuments may be treated with scalding water, or a hot solution of oxalic acid with advantage.

GENTIO-PICRIN.*

BY E. L. PATCH.

In my paper on "Gentian" presented to the Association last year, impure gentio-picrin was referred to as having been obtained in the proximal analysis of the root of *Gentiana lutea*, and I at that time expressed a hope of being able to obtain it free from color and pure enough to ascertain its reactions.

With that intention, three pints of the solution furnished by Professor Lloyd (see page 461, Proceedings 1881) were diluted with water to free from resin, and digested with four pounds of animal charcoal.

The animal charcoal was washed with water, then digested thrice successively with alcohol, the alcoholic washings mixed, the alcohol distilled off, the residue digested with PbO and treated with Sol. Pb. Subacet. to remove remaining color, treated with H_2S to remove Pb, heated to rid of H_2S, filtered, and concentrated. The concentrated filtrate was shaken with ether, the ether decanted, and the residue evaporated. Obtained a light-brown, extract-like body, resembling the impure gentio-picrin, so called, obtained in the proximal analysis of *Gentiana lutea.*

Redissolved in water and again digested with purified animal charcoal, the charcoal boiled in alcohol, the alcohol evaporated, the residue shaken with ether, and allowed to stand thirty-six hours; no change.

The ether decanted and the residue evaporated to dryness gave an amorphous, deliquescent, very bitter substance, that, heated, gave caramel odor, and also gave other marked reactions for sugar.

This would indicate that the so-called gentio-picrin furnished with the paper of last year was largely composed of sugar, and it demonstrates the difficulty of obtaining pure gentio-picrin even in an amorphous condition, effort to free from sugar resulting disastrously to the gentio-picrin.

Absolute alcohol and ether reject sugar, but reject gentio-picrin also. Hydrated alcohol dissolves both. HCl decomposes gentio-picrin. Ferments destroy both.

After experiment and inquiry I know of no method of separating sugar from the glucosides, and we must obtain crystallizable gentio-picrin from fresh roots before we ascertain its reactions.

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* Read at the Third Session.

ON CAFFEINE IN GUARANA.*

BY J. H. FEEMSTER, CINCINNATI, OHIO.

QUERY 30.—What is the average amount of caffeine in the Guarana of commerce as compared with that of the seed? Determine a rapid and pharmaceutically correct method for getting at the percentage of caffeine. Give the most desirable alcoholic menstruum that is adapted to the extraction of caffeine and the preparation of fluid extract of guarana.

IN reply to this query I shall take up the three questions in the order presented.

1. What is the average amount of caffeine in the guarana of commerce as compared with that of the seeds? From a select sample of seeds procured from Messrs. Lehn & Fink, of New York, I obtained five and eight hundredths (5.08) per cent. of caffeine. Taking this as a basis of comparison, five samples of guarana of the usual cylindrical form were purchased from as many dealers, and with these analyses were conducted with the appended results. Five hundred grains guarana used in each case:

No. 1	yielded	21	grains	caffeine,	or	4.2	per cent.
" 2	"	25	"	"	"	5	"
" 3	"	21	"	"	"	4.2	"
" 4	"	19.5	"	"	"	3.9	"
" 5	"	21.5	"	"	"	4.3	"

The aggregate yield of caffeine from the five samples was one hundred and eight (108) grains, making the average per cent. of the five determinations four and thirty-two (4.32) hundredths

2. Determine a rapid and pharmaceutically correct method of getting at the percentage of caffeine from guarana.

The process employed in securing the above result was that recommended by Professor E. S. Wayne for the extraction of caffeine from tea ("Amer. Journal Pharm.," 1875, p. 135), and afterwards used so successfully upon guarana by Francis V. Greene, U. S. Navy ("Amer. Journal Pharm.," 1877, p. 337).

The directions for conducting the analysis are so full and explicit in the article of Mr. Greene that it would seem unnecessary to repeat them, but I will mention that the addition of a few drops of liquor plumbi subacet. to the boiling mixture of guarana, litharge, and water, when the color begins to disappear from the solution, seems to facilitate the deposition of the insoluble portion, and to leave the liquid more free from coloring matter.

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* Read at the Third Session.

The crystals of caffeine from the solutions thus treated are so white that recrystallizing from diluted alcohol is done away with.

The guarana and litharge require to be boiled about three hours before the solution upon the subsidence of the solid matter remains clear, and I was surprised to find, when operating with the seeds, that the change takes place in less than one hour. The cause of this I leave open for future investigation.

A plan for the extraction of caffeine from guarana, tea, or coffee more free from objection than the one proposed by Professor Wayne would be found with difficulty.

It is so free from complications, and can be conducted with such rapidity and accuracy, that it is without hesitation I commend it as the one best answering the second portion of this query.

3. Give the most desirable alcoholic menstruum that is adapted to the extraction of caffeine and the preparation of fluid extract of guarana.

Sixteen (16) troy ounces of guarana in moderately fine powder was moistened with two (2) ounces of a menstruum composed of alcohol, three (3) fluid ounces; glycerin, four (4) fluid ounces; and water, five (5) fluid ounces.

The drug was packed in a conical glass percolator, the remainder of the twelve fluid ounces of menstruum poured on, and after the liquid had disappeared from the surface it was followed by a mixture composed of alcohol, four fluid ounces, and water, twelve fluid ounces.

When the liquid began to drop from the lower orifice a cork was inserted and maceration continued for two days. The percolation was then proceeded with, the first twelve fluid ounces reserved, and two pints more of percolate collected, the last portion of which was void of color and taste. This was evaporated to three fluid ounces, added to one ounce of alcohol, and mixed with the twelve fluid ounces reserved, to make one pint of finished fluid extract.

The finished fluid extract kept bright and free from deposit for several months, but after that time a heavy, chocolate-colored precipitate formed, and, upon examination, was found to contain groups of crystals of caffeine. (Sample submitted.)

The exhausted guarana was removed from the percolator, and, after drying thoroughly, tested for caffeine, yielding about one per cent.

Four additional experiments were made with the following menstrua:

No. 2 contained five (5) fluid ounces of alcohol; No. 3, six (6) ounces; No. 4, seven (7) ounces; and No. 5, eight (8) ounces, the proportion of glycerin corresponding in each case to that used in experiment No. 1.

What I have said concerning experiment No. 1 can be repeated as to Nos. 2, 3, and 4, except that the deposit was diminished as the quantity of alcohol was increased, No. 4 being very slight.

No. 5, containing fifty (50) per cent. of alcohol and four (4) fluid ounces of glycerin to the pint makes a fluid extract which I regard as a true representative of the drug, and the menstruum as containing the least quantity of alcohol in association with glycerin that can be credited with giving good results. Dilute alcohol without glycerin is not free from the objection mentioned in connection with menstrua Nos. 1, 2, 3, and 4, viz., its liability to deposit.

In proof of this, I submit a sample from a lot made in November, 1880, containing fifty per cent. alcohol, but without glycerin.

ON THYMOL FROM OIL OF THYME.*

BY JOSEPH L. LEMBERGER, LEBANON, PA.

QUERY 2.—Oil of thyme of commerce is said to be very often deprived of its thymol. Is this statement true?

IN experimenting with oil of thyme in answer to this query, we have taken for granted that the declaration made by A. W. Gerrard, who ably investigated thymol, its sources, manufacture, and application as an antiseptic agent, was justified by his researches. He is credited with saying: "Oil of thyme is said to yield as much as 50 per cent. thymol on the Continent." We, therefore, hoped to obtain from pure oil of thyme if not 50 per cent., at least a considerable percentage of thymol. The writer purchased nine (9) separate lots of oil of thyme from as many different houses in New York and Philadelphia; only one of these, however, is known to have been distilled in this country, and this one only we feel warranted in vouching for as a pure distillate of *Thymus vulgaris*. The experiments were conducted in the following order:

No. 1 was bought as pure red oil of thyme, and yielded 1.67 per cent. of dark crystals.

No. 2 was bought as pure white oil, and yielded 6.67 per cent. lighter colored crystals.

No. 3 was bought as pure red oil, and yielded 16.67 per cent. of dark crystals.

No. 4 was bought as pure white oil, and yielded .80 per cent. of light-colored crystals.

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* Read at the Second Session.

No. 5 was bought as pure white oil, and yielded .42 per cent. of light-colored crystals.

No. 6 was reported a very old white oil, and yielded, also, only .42 per cent. of light crystals.

No. 7 was bought as pure French red oil, and yielded 7.92 per cent. dark crystals.

No. 8 was the undoubted American white oil, four months old, distilled from dried French herb, and yielded .84 per cent.

No. 9 was a dark-red oil, rich in color and very odorous, obtained direct from the importer, and this yielded 38 75 per cent. dark-colored crystals.

The process used by the writer for separating the thymol consisted in treating the oil with a twenty per cent. solution of pure caustic soda, and, after separating the solution of thymolate of sodium formed, treating this with ether, which, on evaporation, yielded the thymol in the form of irregular crystals. That obtained from the dark oils was dark in color; that from the white oil, much lighter.

Another process was employed upon portions of the same oils to prove the former experiments, namely, that of treating the oil with caustic soda, then separating the alkaline solution, and adding to this hydrochloric acid C. P. so long as the supposed thymol separated or rose to the surface as a float. This float was separated by filtration and weighed after drying; the estimate made appeared to be about the same.

The last process is not as satisfactory, although undoubted crystals were detected in the float, and numerous minute crystals were found adhering to the sides of vessel, which appeared to be the same under the microscope as those obtained by the former process. The odor of this float in some cases, and more especially that obtained from the oils yielding the least percentage of the crystals, was very suggestive of the action of acids upon oil of turpentine, giving rise to a peculiar empyreumatic odor, and corresponds closely with a product described by Gerrard as obtained by him as "being 12 per cent. of oily matter, differing to such an extent in color, odor, and look from thymol that he could not pronounce it as such."

We observe that the dark oils seem to be the richest in thymol.

The experiments as made seem to justify the declaration suggested by the query that very little of the oil of thyme of commerce is pure, but, in all probability, is first deprived of its most valuable constituent by manipulators before it is thrown upon the market.

TESTING OF COMMERCIAL CREOSOTE.*

BY PROFESSOR P. W. BEDFORD.

QUERY 5.—Examine and report upon the creosote occurring in the American market.

THE object of this query can be but one, namely, to inquire whether the wood creosote offered for sale is a pure article or not, and if not, what is the impurity present?

The relative commercial value of the articles sold as coal-tar creosote and wood creosote disposes of the question as to the latter being present in the former article, and we are quite certain that the cheap variety is nothing more or less than a phenol or carbolic acid. Wood creosote, it has been frequently stated, is adulterated with coal-tar creosote or phenol. The object of my experiments has been to prove the identity of wood creosote and its freedom from phenol. The following tests are laid down in various works as conclusive evidence of its purity, and each has been fully tried with the several samples of wood creosote to prove their identity and purity, and also with phenol, sold as commercial creosote or coal-tar creosote, and for comparison with mixtures of the two, that even small percentages of admixture might be identified should such exist in the wood creosote of the market.

The following tests were used:

1. Equal volumes of anhydrous glycerin and wood creosote make a turbid mixture, separating on standing. *Phenol dissolves.* If three volumes of water be added, the separation of the wood creosote is immediate. *Phenol remains in permanent solution.*

2. One volume of wood creosote added to two volumes of glycerin; the former is not dissolved, but separates on standing. *Phenol dissolves.*

3. Three parts of a mixture containing 75 per cent. of glycerin and 25 per cent. of water to 1 part of wood creosote shows no increase of volume of glycerin, and wood creosote separates. *Phenol dissolves and forms a clear mixture.* Were any phenol present in the wood creosote, the increase in the volume of the glycerin solution, if in a graduated tube, would distinctly indicate the percentage of phenol present.

4. Solubility in benzin. Wood creosote entirely soluble. *Phenol is insoluble.*

5. A 1 per cent. solution of wood creosote. Take of this 10 cubic centimeters, add 1 drop of a test solution of ferric chloride; an evanescent blue color is formed, passing quickly into a red color. *Phenol gives a permanent blue color.*

6. Collodion or albumen, with an equal bulk of wood creosote, makes

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* Read at the Third Session.

a perfect mixture without coagulation. *Phenol at once coagulates into a more or less firm mass or clot.*

7. Bromine solution with wood creosote gives a reddish-brown precipitate. *Phenol gives a white precipitate.*

All tests enumerated above were repeatedly tried with four samples of wood creosote sold as such; one a sample of Morson's, one of Merck's, one evidently of German origin, but bearing the label and capsule of an American manufacturer, and one of unknown origin, but sold as beechwood creosote (German), and each proved to be *pure wood creosote.*

Two samples of commercial creosote, which, from the low cost, were known to be of coal-tar origin, gave the negative tests, showing that they were phenol.

Corroborative experiments were made by mixing 10 to 20 per cent. of phenol with samples of the beechwood creosote, but in every case each of the tests named showed the presence of the phenol.

The writer, on other occasions, applied single tests (the collodion test) to samples of beechwood creosote that he had an opportunity of procuring small specimens of, and satisfied himself that they were pure. The conclusion is that the wood creosote of the market at the present time is in abundant supply, is of unexceptionable quality, and reasonable in price, so that there is no excuse for the substitution of the phenols commonly sold for it. When it is directed for use for internal administration (the medicinal effect being entirely dissimilar), wood creosote only should be dispensed.

The general sales of creosote by the pharmacist are in small quantities as a toothache remedy, and phenol has the power of coagulating albumen, which effectually relieves the suffering. Wood creosote does not coagulate albumen, and is, therefore, not as serviceable. This is, perhaps, the reason that it has become in a great measure, supplanted in general sale by the coal-tar creosote, to say nothing of the argument of a lower cost.

ON THE PURITY OF POWDERED DRUGS.*

BY C. B. ALLAIRE, PEORIA, ILL.

Query 19.—What percentage of the more important powdered drugs ordinarily obtainable in the market are of a reliable character, and suitable for dispensing purposes?

In considering this question, I shall report only upon samples of powdered drugs usually sold in bulk, or what are known as paper packages.

It is not presumed that goods, which are put up in suitable packages, of say 1 pound or less, for the wants of the consumer, and which bear the label and address of the manufacturer, need investigation, for the reason that no manufacturer, who hopes to retain his trade, would be so short-sighted as to put his address on packages of goods which he knew would fall into the hands of the consumer, and who, finding by experience their want of reliability, would, as a matter of course, avoid the same brand in his future purchases.

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* Read at the Fourth Session.

Having thus limited the question somewhat, we find that the general sources of supply are mainly two:

1st. Drug millers who buy their crude material as cheaply as possible, powder it, and sell to large buyers; these we shall designate as merchant millers.

2d. Custom mills, those to which any one can send goods to be powdered as they direct: the usual charge for this service is about seven cents per pound for large lots.

Probably nine-tenths of all the goods put upon the market in this country are from one or the other of the above sources.

The usual mode of shipping these goods is in boxes of 25 and 50 pounds, or, in barrels, according to the wants of the purchaser, who, if he sells them again, usually ships them in paper packages; and here is where the identity of the goods is lost. The retail dealer who thus receives them knows nothing of the history of the goods or who is responsible for their lack of quality, or entitled to credit if found reliable. He knows the jobber from whom he buys does not make them, and if he specifies "same as the last," or "better than the last," when ordering, the jobber may not be able to carry out his instructions, as he buys usually from many sources, discriminating in favor of the mill having the best reputation if prices are equal.

I am glad to be able to state that there are several custom mills in the larger cities where drugs may be sent for powdering, with certainty that they will be returned to the sender in a state of absolute purity if so desired, and from this source our most careful jobbers supply themselves, sending prime goods and receiving pure, prime quality powders in return.

It is now, and always has been, possible to procure powdered drugs of absolute purity and prime quality, by those who are willing to pay an adequate price, and exercise discrimination in their purchases.

In buying powdered drugs, where deception is so easy and detection so difficult, more attention should be paid to quality and the reputation of the manufacturer than the price.

From an extensive experience in the trade, I am fully satisfied that the number of large dealers supplying the retail trade, who would furnish inferior goods when the best quality was demanded and paid for, is extremely small; and furthermore, that the present large percentage of adulterated goods in the market, is the result of a wide-spread demand for cheap goods, or rather, low-priced goods, for adulterated goods are never cheap.

That the percentage of inferior goods in the market is large, is clearly shown by the fact that four hundred and sixteen (416) samples taken from various sources and examined during the past year gave the following results: Two hundred and twenty-seven (227), or about 54 per cent., were pure, or at least no adulteration was detected; and one hundred and eighty-nine (189), or about 46 per cent., were sufficiently adulterated that detection was easy. These figures do not include substitutions of low-grade goods for a higher or more valuable grade, nor do they include the cases where wormy or damaged goods have been skilfully powdered to promote their sale, but only such samples as clearly showed by the microscope the addition of foreign matter in quantity sufficient to materially affect the bulk and value.

The following table may present some curious features and prove of value in showing the classes of goods most liable to adulteration.

Microscopic Examination of Four Hundred and Sixteen Samples of Powdered Drugs.

Powders examined.	No. each.	Pure.	Adult.	Powders examined.	No. each.	Pure.	Adult.
Acacia	1		1	Gentian	3	3	
Aconite Root	1	1		Ginger, East India	2		2
Aconite Leaves	1	1		Ginger, Java	11	2	9
Aloes, Socotrine	11	10	1	Gold Seal Root	11		11
Aloes, Cape	1		1	Guarana	2	1	1
Asafœtida	2	1	1	Guaiac Resin	2		2
Angelica Root	3	3		Hellebore, Black	2	2	
Arrowroot, St. Vincent	3	1	2	Hemlock Bark	2	2	
Ash Bark, *Prickly*	2	2		Henbane Leaves	2	2	
Bayberry Bark	3	3		Hydrangea Root	2	2	
Belladonna Leaves	2	2		Indian Hemp, Black	2	2	
Belladonna Root	1	1		Indian Turnip	2	2	
Beth Root	1	1		Indigo, Wild	2	2	
Blackberry Root	2	2		Ipecac	45	7	38
Blood Root	4	4		Jalap	13	10	3
Black Haw, Bark of Root	1		1	Kino	2	2	
Buchu, Short	3		3	Kousso Flowers	2	2	
Calamus	2	2		Lady Slipper Root	2	2	
Cantharides	4	4		Licorice Root	12	12	
Caraway Seed	2		2	Licorice Extract	36		36
Capsicum, Afg	10	4	6	Lobelia Leaves	2	2	
Cassia Bark	2	2		Lobelia Seed	1	1	
Celery Seed	2	2		Lupulin	2	2	
Cloves	4		4	Mandrake Root	5		5
Cohosh, Black	2	2		Marshmallow Root	2	2	
Cohosh, Blue	2	2		Myrrh	2		2
Colchicum Seed	3	3		Nutgalls	2	1	1
Colchicum Root	2	2		Opium	11	9	2
Colocynth	3	3		Orange Peel	2	2	
Columbo Root	2	1	1	Orris Root	2	1	1
Conium Leaves	2	2		Pareira Brava	2	2	
Cramp Bark	2	2		Parilla, Yellow	2	2	
Cranesbill Root	2	2		Pepper, Black	2		2
Cubebs	3	1	2	Pink Root	2	1	1
Culver's Root	2	2		Pleurisy Root	2	1	1
Cinchona, Pale	11	2	9	Poke Root	2	2	
Dextrin	3		3	Poplar Bark, *White*	2	2	
Elm Bark	5	2	3	Rhatany Root	2		2
Ergot	8	8		Rhubarb	44	26	18
Foxglove Leaves	2	2		Sarsaparilla	2	2	
Fringe Tree, Bark of Root	1		1	Sassafras Bark	2	2	

POWDERS EXAMINED.	No. each.	Pure.	Adult.	POWDERS EXAMINED.	No. each.	Pure.	Adult.
Savin	2	2		Stramonium Leaves	2	2	
Seneka	2	2		Tamarac Bark	1	1	
Senna	2	2		Tragacanth	3	2	1
Skunk Cabbage Root	2	2		Unicorn Root	2	2	
Snakeroot, *Canada*	3	2	1	Uva Ursi	3	3	
Soap Tree Bark	2	2		Valerian	5		5
Soap, Castile	2	2		Wafer Ash Bark	2	2	
Squills Root	2		2	Wahoo, Bark of Root	2		2
Stillingia Root	2	2		Wild Yam	2	2	

From the above it will be seen that such goods as are generally in small demand or low in price, are rarely adulterated, also such goods as aloes and cantharides, of which there are two or more grades in the market, are generally apparently pure.

In ergot, all the samples, eight in number, were found pure. Here we have plenty of cheap wormy material, obtainable at very low prices, which renders gross adulteration unnecessary.

Of golden seal root, which, during the past year, was at times very scarce and high, every sample examined, eleven in number, was found adulterated.

It may seem strange that in so cheap an article as pale cinchona, nine samples out of eleven should be adulterated, but such was the case, the adulterants consisting largely of starchy matter easily detected.

The barks of roots, such as fringe tree and wahoo, were in all three cases found to be prepared from the whole roots instead of the bark. These were considered as adulterated, as also were the pleurisy, pink root, and valerian samples, which were so dirty as to materially affect the value of the powder.

All the samples of extract of licorice, thirty-six in number, were found adulterated. Corn-starch and sugar were most commonly used, probably with the double object of making the powder permanent and increasing the bulk. In every case the percentage of adulteration was far greater than necessary to secure permanence in the powder. In no cases were the goods sold as a mixture of extract and either starch or sugar.

Guaiac resin and myrrh were in every case found adulterated, probably with the object of securing permanence, as the sale of neither is very large.

Ipecac was found adulterated in thirty-eight samples out of forty-five, the object here being purely one of profit. In some cases American ipecac was used as the adulterant, in others simple starchy bodies.

Rhubarb was found to be adulterated in eighteen cases out of forty-four, Rhapontic rhubarb being largely used for this purpose. During the past year so-called rhubarb root has been procurable in London at about seven pence per pound, and in New York at fifteen to twenty-five cents per pound. This, with the usual abundance of wormy root always obtainable, has made a guaranteed pure powder, of questionable value, procurable at almost any price the buyer might name. It will, therefore, be seen that it is an easy matter for drug millers to meet the requirements of the trade so far as price is concerned. It might be further added, as throwing some light on the subject, that there are parties engaged in preparing adulterants, costing from two to four cents per pound, the manufacturers of which agree to match in color and appearance any powder that may be submitted. The writer has had these goods offered to him repeatedly for purchase, and has positive knowledge of drug millers who are or have been using them in large quantities. Samples are herewith submitted for inspection.

These examinations were not made from suspected samples or with the intention of making an unfavorable showing. A large portion of them were taken from one drug stock at one time, soon after the passage of the Illinois pharmacy law, and were examined by Mr. E. B. Stuart and the writer, with the object of ascertaining the true character of the stock. The microscope was used largely in obtaining these results, which were confirmed as far as possible by chemical and pharmaceutical tests.

It is believed that in the hands of an expert, or even one of moderate experience, the microscope furnishes the most ready and satisfactory means of detecting gross adulterations in powdered drugs. The preparation of a small sample of known purity and reliability, as a standard, is a matter of small moment; from this by comparison, the presence of foreign substances in the suspected sample is easily ascertained. The identification of the adulterant when found is a matter of more or less difficulty according to the experience of the operator. Carefully prepared cross, diagonal and tangential sections of vegetable drugs will also be found useful in identifying structure, etc.

In addition to the foregoing statements the following results were recently obtained by Mr. George W. Hayes: Twelve samples of powdered rhubarb were purchased, at prices varying from fifty cents to one dollar per pound, all supposed to be pure; they were tested by color, odor, taste, grittiness, infusion, decoction, alcoholic tincture, chloroformic tincture stain, percentage of aqueous extract, percentage of moisture, percentage insoluble in cold distilled water, comparative height of column when suspended in distilled water, Rillot's test for Rhapontic rhubarb, percentage of mucilaginous matter, cathartic, chrysophanic and tannic acids, and microscopic appearances. Four were found adulterated with Rhapontic rhubarb, three were prepared from wormy or otherwise inferior root. and none of the samples were equal in quality to the standard used for comparison.

Another examination, by S. S. Bradford, of 10 samples of powdered rhubarb, tested for color, ethereal extract, microscopic appearance, alcoholic extract. ash, and by boracic acid for turmeric, showed 4 of good quality, 1 mixed grades, 1 adulterated with Rhapontic rhubarb, 1 adulterated with foreign starchy matter, and 3 were made from wormy root.

Mr. J. F. Llewellyn examined 7 samples of powdered rhubarb purchased in Cincinnati, Chicago, Louisville, St. Louis, Kansas City, and Macon, Mo.: all were found inferior to the standard; 2 were classed as fair quality, 1 damaged, 2 very poor, and 2 viciously bad.

Mr. Theodore H. Wurmb examined 15 samples of powdered ipecac. 4 were found adulterated with potato-starch, 3 were adulterated with wheat flour, 1, containing only .63 per cent. emetia, was presumed to have been partially exhausted previous to being put upon the market; 1 was adulterated with wheat flour and licorice root, 2 adulterated with some unknown material, and 4 only, or about 27 per.cent., were found to be pure.

Mr. Virgil Coblentz examined 12 samples of powdered jalap obtained from New York, Philadelphia. Cincinnati, St. Louis, Chicago, etc. He does not give the results of any examination for adulterants, but bases his conclusions upon the percentage of resin obtained from the various samples, which were as follows: Accepting 12 per cent. to 18 per cent. as the proper limits for prime goods, only 2 met this requirement, the remaining 10 yielding the following percentages respectively, 11.5, 9.83. 8.2, 6.8, 6.2, 6.1, 5.8, 5.3. 4.8, 3.8. The conclusion is evident that at least 85 per cent. of the samples examined were unfit for prescription purposes.

Mr. Thomas Knœbel reports on 7 samples of powdered jalap as follows: Percentage of resin respectively, 17.12. 11.25, 9.75, 9, 8.75, 8.38, 8. On the basis given above only 1 of the 7 was up to standard.

Mr. George D. Hayes reports on the examination of 9 samples of commercial powdered opium, obtaining the following percentages of morphia: 13.6, 12.5, 9.45, 7.5, 7.25, 6.75. 6.25, 5.75. 5.75. Taking the accepted standard of 10 per cent. morphia, it will be seen that only about 22 per cent. of the samples examined were suitable for use in officinal preparations or for prescription purposes.

Mr. John Palmer, Jr., reports on 6 samples of powdered opium, giving the following percentages of morphia respectively: 10.5, 10.25, 8.25, 6.5, 5.5, 4.5.

One paper received by the writer on the same subject gives such very low percentages of morphia as to cast suspicion upon the character of the work. It will not be included in this report.

Another, on the same subject, is based upon a defective process, and though the results were not far from what might be reasonably expected, it is not considered reliable, and will not be further referred to.

Mr. V. E. Phillips reports upon the examination of 12 samples of powdered extract of licorice: 5 were found to contain powdered licorice root. 4 contained sugar, 7 contained starch, in quantities varying from 7 to 44 per cent., 3 contained both starch and sugar. Those containing sugar had from 5 to 27 per cent.; every one of the samples was more or less adulterated.

Mr. G. H. C. Klie reports on the examination of 7 samples of powdered extract of licorice: 4 contained powdered root in quantities varying from 22.5 to 46.35 per cent., 2 contained respectively 32.5 and 37.85 per cent. of starch, 1 contained both starch and powdered root to the extent of 40 8 per cent. As compared with a pure extract the glycyrrhizin found was as follows, the standard being estimated at 100, viz., 42.43, 41.32, 41.11, 37.7, 29.86, 28.29, 24.09, so that the best of these samples probably did not contain over the same percentages of pure extract, or if they did, the extract was prepared from Greek or other low-grade roots deficient in glycyrrhizin.

William H. Newell, M.D., reports on the examination of 104 samples of powdered yellow cinchona bark, which were tested for quinia and cinchonia only; 75 contained over 1 per cent and under 2 per cent. of the combined alkaloids named, 20 contained less than 1 per cent. and over ½ of 1 per cent. of those alkaloids combined, 14 contained less than ½ of 1 per cent. of the combined alkaloids; 22 are reported as being more or less adulterated.

The same party reports on 88 samples of powdered red cinchona bark. These also were assayed for the quinia and cinchonia only. 10 samples contained over 1 and less than 2 per cent. of combined alkaloids, 33 contained between ½ and 1 per cent. of comoined alkaloids. Of the remaining 45, or over one-half of the samples, 15 contained no estimable quantity of either alkaloid.

The same party reports on 84 samples of powdered pale bark. Not one was found to contain any estimable quantity of quinia, and cinchonia, if found at all, was in no case found in a quantity equal to .1 of 1 per cent. of these; 26 were reported adulterated.

In the foregoing statements, after excluding the reports on powdered cinchona barks and the two reports on powdered opium as either incomplete or not fully reliable, we have remaining the results of careful examinations of 516 samples of powdered drugs, taken from nearly every large city or distributing point in the United States. Of these 516 samples, 269, or over 52 per cent. were found adulterated or otherwise inferior to the recognized standards.

This is truly a lamentable showing, and it seems desirable that the sources of information on which these figures are based should receive some attention. When this query was accepted one year ago at

Kansas City the writer was fully impressed with the importance and magnitude of the question involved. To do the subject anything like justice more time would be required than was at his command. To confine the examinations to any one section would render the work unsuitable for presentation before this Association. To undertake to do all the work himself might render the results subject to impeachment from implied interested motives. It was therefore decided to enlist others in the work in such a way as to bring out general and reliable results of an unbiassed character.

As probably most of you are aware, prizes of three degrees of value were offered for papers on the examinations of the most important powdered drugs. In response to this offer papers were received from students and others expert in Charlestown, Mass., St. Louis, Mo., Springfield, O., Mexico, Mo., Bucyrus, O., East St. Louis, Ill., Philadelphia, New York city, Olney, Ill., Dayton, O., and Jersey City, N. J. From some of these cities two or more papers were received. Many of these papers bear evidence of great care and the exercise of considerable ability in the treatment of the different subjects. Necessarily only general results can be given here, but the essays will be published in detail from time to time in the various journals, and possibly afterward collected in pamphlet form for those desiring to review the subject more fully. The balance of the work has been done by Mr. E. B. Stuart and myself, and is taken from our joint or individual notes of examinations made from time to time during the year. It will therefore be seen that the work is general in its character and as free from questionable motives as is possible under the circumstances.

Legislation seems to be powerless to cure this evil. Nearly all the States are provided with good pharmacy laws, which provide for the punishment of acts of adulteration, but we have yet to hear of the first conviction under any of these laws.

As has before been hinted pecuniary interest is largely responsible for this state of affairs, together with apathy, indifference, and ignorance on the part of the drug trade. How many druggists, taking the entire body, are capable of detecting adulterations with any degree of certainty in any one of the more important powders? How many will take the trouble to examine the goods they receive? Where is the remedy? Not in legislation alone, certainly, and not in education combined with indifference, but in education combined with vigilance. It seems to the writer that more attention should be given in our colleges of pharmacy to structural botany and the skilful use of the microscope, and that our students should be taught from the beginning to the end of their pupilage that on them rests a great responsibility in their relations to the public in this matter, and that eternal vigilance is the price of pure drugs.

MINUTES

OF THE

THIRTIETH ANNUAL MEETING.

First Session.—Tuesday Afternoon, September 12th, 1882.

THE American Pharmaceutical Association assembled at its thirtieth annual meeting, in the ball-room of the Cataract House, at Niagara Falls, N. Y., President, P. W. Bedford, in the chair; John M. Maisch, Secretary.

At 3 30 P.M. the President declared that there was more than a quorum of members present, and after calling the meeting to order, appointed a Committee on Credentials, consisting of Messrs. Eli Lilly, of Indianapolis, P. C. Candidus, of Mobile, and A. W. Miller, of Philadelphia. The credentials were handed in and the committee retired to attend to the duties assigned to them.

The Local Secretary, Mr. Hiram E. Griffith, being introduced by the President, welcomed the Association with the following remarks, which were received with hearty applause:

MR. PRESIDENT, LADIES, AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION: It becomes one of the most pleasant duties of my life to bid you welcome to my boyhood's home—to the historic shores of old Niagara.

There are before me many faces of very dear friends, and I hope this occasion of your visit here will be replete with many joyous moments, to which you may refer ever after in life with great pleasure, and I only regret, dear friends, that this is not my castle and you my honored guests, for faithful and true knights are here that are steadily battling in the fields of this great century of advancement and steadily pushing the world up into light.

There is no doubt but there is variety enough here to please all. You who are tempted to turn aside from your daily paths to find pleasure in geology will perceive that the finger of time and hand of ages have been busily at work to aid your Local Secretary by arranging before you shelves of specimens miles in length. Entomologists, if not successful in capturing anything new or strange, may be able to take home with them a peculiar buzzing in their ears, said to be purely local, by sour, old gouty people; but you, my friends, with your ability to analyze and to extract the active principles from plants, may even obtain from this source some alkaloid of enjoyment. For the chemist who can compound an elixir out of dry historical facts, there are battle-fields around him, and thrilling tales in every rock.

Here nature has been very lavish with that which we can all enjoy. Her botanical garden is large and varied. It has been said by an eminent botanist that Goat Island alone contains as many different varieties as most States, and as you wander in these groves some familiar plant may nod its head to you, or beneath these cliffs far up you may yet see a white, golden, scarlet, or orange banner waving you a welcome, whose nationality or genus you will recognize.

You, my friends, have all more or less trained your eyes to see the beauties of the plants and weeds by the roadside, and have found great pleasure in studying God's works in humble things, and now, with that trained, artistic eye to enjoy, there is spread out a feast for you greater than any banquet you have yet sat at, and when you have gone away you may take with you some of the love like that in my own heart, for this the grandest river that rolls its waters to the sea, whose life is like many here before me—restless, tireless, always pushing on.

On behalf of the Association the President expressed due appreciation of the words of welcome offered by the Local Secretary, and then proceeded to deliver the President's annual address, as follows:

MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

GENTLEMEN: It is with great pleasure that I greet this unusually large attendance of members of the American Pharmaceutical Association to hold its thirtieth annual meeting.

The surroundings are comparatively novel in our history, for heretofore, with the single exception of Saratoga Springs in 1880, we have always convened in the large cities. This gathering is particularly pleasant, in that we meet away from business cares and business anxieties, in one of the most charming of localities, where nature has furnished the most wonderful accessories of its kind to be found anywhere on our continent.

Our gathering celebrates the fact that three decades have passed since this Association was organized in the city of Philadelphia.

Let me revert for a few moments to the history of this Association in its earlier days, that we may contrast it with its present condition, and allude to its effect upon pharmacy and the pharmaceutical condition of our land. On the 15th of October, 1851, there assembled at the rooms of the College of Pharmacy of the city of New York, in response to the request of the board of trustees of that college, nine druggists; three each from the cities of Boston, Philadelphia, and New York, and representing the colleges of pharmacy of those cities. Their object was to discuss matters relative to the importation of drugs and chemicals from abroad. Their discussion lasted through two sessions, and the members were so gratified with the results attained that they resolved to hold a future meeting and invite all pharmaceutical bodies to join with them; and in accordance with this, a call was issued to meet in Philadelphia, October 6th, 1852. The meeting was held in the Philadelphia College of Pharmacy, then in Zane Street.

Of the nine who met in New York in 1851, five still survive; three of them are yet identified with the drug business, and two of the three are still members of this Association.

The meeting of 1852 was attended by eighteen delegates; and by invitation, Professors Wood, Bache, and Carson, and the professors of the Philadelphia College of Pharmacy, were invited to participate, as also a druggist from Maryland and one from Pennsylvania.

Of the twenty-five who met thirty years ago, all but seven or eight have passed from this sphere of existence; and but one of that assemblage of thirty years ago is with us to-day, our honored and beloved member, Charles A. Heinitsh, of Lancaster, Pa.

During the first three years of this Association its discussions and business arose mostly from the reports of committees, and it was not until 1855 that any essays were read by individuals. In that year Mr. A. P. Sharp, of Baltimore, read a paper on "Commercial Acids," and E. S. Wayne, of Cincinnati, one on "Grape Culture and its Products in Ohio."

In 1856 twelve excellent papers were presented, one each by R. Battey, of Rome, Ga.; E. Parrish, J. M. Maisch, and S. S. Garrigues, of Philadelphia; Professor Aitken, of Baltimore; and seven by E. S. Wayne, of Cincinnati.

At this meeting was first established the present plan of presenting queries at one annual meeting to be reported upon at the next annual meeting, and amongst other important subjects was a report on "Text Books," by Professor Procter, and committees were appointed to report on "Progress of Pharmacy," on "Sale of Poisons," on "Syllabus of Study," on "The Participation of a Committee of that Body on the Work of Pharmacopœial Revision," and on "Unofficial Formulæ."

At this meeting a modification of the constitution was adopted, which greatly increased the scope and usefulness of our Association. It was at this meeting that we first find the names of two new members, then young and promising, and successive years have only added the record of faithfulness and earnestness to my friends, John M. Maisch and Charles A. Tufts.

In 1857 valuable reports were read on "Weights and Measures," on "Local Formulæ," "Sale of Poisons," on "Progress of Pharmacy," and several excellent papers were contributed.

In 1858 the report of Professor Procter on "A Syllabus of Study on Pharmacy" was one of the most admirable ever made to the Association. The paper of Israel J. Grahame on "Percolation," at the same meeting, seemed a novel idea as compared to the olden-time process used in exhausting drugs, but it was an important step in the right direction, and has made the modern process of percolation one of the distinguished features of American pharmacy. At this same meeting we first notice the name and presence of Dr. E. R. Squibb as a member, and right royally has he served this Association as an able and honored laborer in pharmaceutical knowledge.

In 1859 our published Proceedings show that our members contributed largely towards improving pharmaceutical processes, and later we find that on the Committee of Revision of the U. S. Pharmacopœia, out of nine on that committee our Association was represented by six of the number.

The reports of Professor Procter on "Fluid Extracts" in 1859, and again in 1863, and the more recent papers of Dr. E. R. Squibb on "Repercolation," have made it possible for the pharmacist to produce at a moderate expense the peculiarly American products that even yet are scarcely appreciated abroad sufficiently to overcome the prejudices that exist to any modification of their more ancient methods.

The report of the Committee on Pharmacy Laws, made at the meeting of 1869, in Chicago, has been the basis of each and every pharmacy law since enacted, and there are to-day none in force which are in any way superior to the draft of law recommended by this Association.

The reports on "Progress of Pharmacy," made first by Professor Procter, and now an annual feature of our Proceedings, were subsequently made by E. Parrish, elaborated in 1860–1862 by Professor Maisch, and since that time by Mayer, Scattergood, Moore, Enno Sander, Hoffmann, Mahla, Wenzell, Mercein, and for 1867 and 1868, again in 1873, and ever since, by our worthy colaborer, Professor C. L. Diehl, have no superior of their kind.

But I can only now allude to the scholarly and yet practical papers of Professor Maisch, E. R. Squibb, M.D., C. Bullock, F. F. Mayer, C. T. Carney, C. L. Diehl, W.

Saunders, J. U. Lloyd, L. Dohme, and Charles Rice, and the no less valuable contributions of E. Parrish, G. F. H. Markoe, J. P. Remington, A. B. Taylor, W. J. M. Gordon, W. H. Pile, J. T. Shinn, F. Bringhurst, J. L. Lemberger, and many other equally valuable members, to show that our Association has been a powerful aid to pharmaceutical knowledge.

The growth of our Association may claim our attention for a moment. At the close of its first decade, 1862, it had 6 honorary members and 588 active members. In 1871 it had 23 honorary members and 920 active members. In 1881 it had 20 honorary members and 1423 active members, while its mortuary list records the passing away of 14 honorary and 230 active members.

Its largest accessions were in the years 1879–1881, the reports of the Executive Committee showing the election in those years of 86, 172, and 142 members.

At the meeting of 1880, at Saratoga Springs, the Association adopted the amendments to the constitution providing for a Council, to whose consideration and action was confided much of the purely business matters which previously had come before the whole body for discussion and action.

At the meeting last year, at Kansas City, the good work of the Council was apparent to all that were present. It enabled much more time to be given to the reading and discussion of papers, and, it cannot fail to commend itself as one of the very best innovations made on our part in the methods of conducting business. It has entailed considerable labor on the Secretary of the Council, and, knowing from my own experience the time and duties required at his hands, I respectfully submit that it is worthy of compensation. I therefore recommend that an appropriation be made for his services in the past year, and that an annual compensation be paid in the future. This latter action would necessitate an amendment to the by-laws of the Council, which would best be made by the addition to chapter iii., article 3, of the words, "He shall receive from the Treasurer —— dollars annually, as compensation for his services."

Regarding the duties of the specially representative officers of the Association, it needs hardly to mention that our Permanent Secretary and the Treasurer are veterans in the service, and that they are in the habit of doing well the various duties of these offices. Their own reports will more fully acquaint you with the details, and the committee to whom they are to be referred will, in due time, report their observations.

The Report on Progress of Pharmacy, I am informed, is complete and ready for publication.

The Local Secretary has of late been fully occupied with the details of his duties. He is not an officer who makes written reports to the Association, but I doubt not that his deeds will bear the scrutiny of all, and be awarded the measure of favorable comment it merits.

At the last annual meeting a special committee was authorized and appointed whose duties were to arrange for the entertainment of the members at this present meeting. They have prepared an elaborate programme, and I have no doubt that in its prosecution we shall all esteem it a great success.

In future the principle now established of "Pay as you go" should be adhered to, and I recommend that a Committee on Entertainment should be placed among the standing committees.

The committee should consist of not less than three members, and its chairman should be located in New York. The reason for the latter is, that the duties assigned to this committee should include transportation as well as entertainment, and the matter of railroad transportation can be better arranged in New York than elsewhere.

This committee should, in my judgment, be named by the President, after the Association has decided where the next annual meeting shall be held.

The thanks of the Association are due to the present committee for the efficient services they have rendered.

I desire to call the attention of the Association to the fact that our roll of honorary membership numbers less than in previous years. You need not to be reminded that there are those who would honor our Association by such personal affiliation with us, and I recommend that a selection of such names be made for your consideration and action.

At the meeting of 1880 President George W. Sloan called the attention of the Association to the fact that the customary time at which our annual meetings are held is not one which suits a very large number of our membership. I have been for years convinced that it would bring out a very much larger attendance of our members from the South and West if it were held in August. The present time (September) is one that is far from convenient for many pharmacists, as the increase of business in cities after September 1st entirely precludes many of our members from attending. While it is not desirable to fix a definite time of meeting continuously, I earnestly desire the consideration of a period which shall enable all members to return to their homes by the close of the month of August.

I call your attention to what has always seemed to me to be a very desirable change in our mode of conduct of business in this Association.

It is that the election of officers should occur at a later period in our proceedings than now assigned it in the order of business, or that the officers elected should not assume the duties of their positions until the closing session of the annual meeting.

I am perfectly aware that this subject has on two occasions been brought before this Association, and each time defeated. Last year it was introduced by Professor Markoe, in a resolution offered at the first session (see page 490, Proceedings, 1881). Without an opportunity for debate, a motion for indefinite postponement was offered, and, being carried, the proposition was for the time lost.

I request that the Association give this matter consideration, believing that our ends will be better served by the presiding of officers who come into the chairs with a better knowledge of the work and requirements than it is now possible to do. The objection against it is mainly that it might happen that the President might not be able to be present at the meeting.

This has only occurred four times in the history of our Association: in 1857, when, owing to the absence of the President in Europe, the Vice-President occupied his position; again in 1859 and 1871, and last year at Kansas City. Four times* in thirty years, and in each case the position was filled without inconvenience. On the other hand, if the President is to occupy the position for the whole of the coming meeting rather than for one sitting only, there is little doubt that the effort would be made to attend. The great objection, however, is the interruption of business at the beginning of our most important business, and the inauguration of a new presiding officer, who is ignorant in a measure of what is to come before the meeting. I think I speak the minds of a large number of those who have preceded me in this honored position when I urge this consideration upon the Association.

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* The published Proceedings of the following ten years show that at the meetings held in 1855, 1867, 1868, 1869, and 1881, the President was absent; in 1853 and 1857 the President and First Vice-President were absent; in 1854 and 1859, the President, First Vice-President, and Second Vice-President; and in 1871, the President and the three Vice-Presidents were absent; on the latter occasion a President *pro tempore* had to be chosen.—SEC.

A matter which has been a sore disappointment to our entire pharmaceutical fraternity, is the failure of Congress to take any action toward removing the odious "stamp tax."

As most of you are aware, the subject was brought to the attention of Congress, that it was discussed in the Senate, was favorably considered, but failed to obtain equally reasonable treatment in the House of Representatives, and so failed for the present.

This Association, and every State pharmaceutical association, should unite in an effort to secure the long-delayed justice in the matter that is our due.

The British Pharmaceutical Conference met at Southampton, August 22d and 23d, under the presidency of Professor John Attfield, Ph.D., about one hundred and twenty members being in attendance. A brief account of the meeting has reached me, by which it seems that the reading of scientific papers was as usual a prominent feature, no less than twenty-four having been read and discussed at length. The notes at hand are too brief to make any criticism upon them, nor can we here allude to any in detail. Among the list of papers read, we notice the following topics: "Alkaloidal Value of Belladonna Plants;" "Action of Digestive Ferments on Drugs;" "Aconite Root;" "Ammoniated Extract of Ergot;" "Microscopic Organisms in certain Inorganic Solutions;" "Solubility of Morphia Salts;" "Cinchona;" "Investigation of Concentrated Solution of Iodide of Iron;" "Commercial Samples of Tincture and Liquid Extract of Opium;" "Purity of Silver Salts;" "Half-hour with a few Sheets of the New U. S. Pharmacopœia."

The papers are of a high scientific character, and, as compared with those usually presented at our meetings, seem more adapted for a chemical than a pharmaceutical body. Two of the papers are of interest to us, one from the fact that the conclusions reached by its author, Mr. D. B. Dott, are apparently antagonistic to the results and conclusions of two of our members, Professor F. B. Power, and Professor J. U. Lloyd, on the same subject, "The Solubility of Morphia Salts." The other paper is that of Professor J. Attfield being a brief review of some of the advanced sheets of the U. S. Pharmacopœia, furnished him by a member of the Committee of Revision. The discussion of this paper elicited the fact that at no distant day a revision of the British Pharmacopœia would be begun.

I have not alluded to the progress of pharmacy, the array of new facts in the science of chemistry, nor the new drugs that have been brought to notice during the year, for all that will be ably and better done by our reporter on the Progress of Pharmacy, Professor C. L. Diehl.

I must, however, call your attention to the almost accomplished fact of a new Pharmacopœia, or rather the approaching issue of the sixth decennial revision of that work. This Association may congratulate itself on the fact that the report made in response to its action at the meeting in Toronto, in 1877, and which report was presented at the meeting in Indianapolis in 1879, and subsequently published mainly by the liberality of members of this Association, has determined not only the method, but to a large degree the compilers, of this valuable work. None will dispute the noble and self-sacrificing labors of its chairman, or withhold from him the praise that is justly his due. The publication of his report in 1879, and its distribution to the members of the Pharmacopœia Convention of 1880, enabled it to become the "base of operations," and it has well filled its duty.

The special contributions of each of the other members of the committee were mentioned in the preface to that report, and I note here, not only the valuable work by that committee, but subsequently on the Committee of Revision of the Pharmacopœia by the members of this Association who are so well known to you all.

On the final Committee of Revision, out of the twenty-five members, appear the names of fifteen who are members of this Association.

It is conceded by all who have examined its pages that the work is a great advance on its predecessor, and that it will take the first rank in the pharmacopœias of the world. It will be of interest to you to know that before another month has passed by the volume will be ready for your possession and use.

During the past year State pharmaceutical organizations have been effected in Massachusetts, Indiana, Virginia, Louisiana, and Nebraska, and from each of these associations we this day have delegates present to meet and confer with us. To each of these delegates we extend a hearty welcome, and trust their sojourn will not only be a pleasure socially, but also a profit pharmaceutically. It is evident that the organization of State pharmaceutical associations is a most valuable auxiliary in fostering pharmaceutical knowledge and education; and that the enlisting of such a large number of associates in this cause is practically the very work which this Association has always had in view. We cannot but rejoice to see the rapid spread of such organizations, and the talent which is being developed in experiment, assay and essay. It is widely spreading the desire to increase the means of pharmaceutical education, and the growing number of adjunct institutions in which pharmacy and its allied branches are being taught is gratifying. At present there are over 5000 members of State pharmaceutical associations; and there are numerous local organizations, the details on which it seems quite impossible to obtain satisfactory returns.

From information obtained, it appears that the total membership of the various State pharmaceutical associations now numbers over 5000. This is a leavening influence which will be of vast importance in raising the standard of pharmaceutical education in the near future, and is the most hopeful sign of encouragement as to the present improvement of pharmaceutical products.

There is one feature, however, that must not be forgotten; it is that the new interest that has been created in State associations has detracted somewhat from the working force of this organization, and investigations and essays that would otherwise have been the property of this Association are transferred to the State organizations. We should not desire to lessen any from the attractions and labors for the State associations, yet we cannot but urge our members that they should be as willing and ready as ever to contribute to the work and interest of these meetings. In fact, the younger organizations should aid us in membership and in literature more than before. It was an honor to build up this organization; it is no less an honor to maintain its usefulness and pre-eminence in pharmaceutical labors. State pharmaceutical associations must necessarily seek State aid and protection for those engaged in pharmacy, by the enactment of reasonable pharmacy laws; to foster friendship among its members by settling the unpleasant features of trade opposition and competition; to arrange amicably among themselves the animosities that too frequently arise from thoughtless ambition or other motives that may tend to demoralize a portion of our members into trade methods, that do harm to sound business enterprise, and wrong their neighbor by questionable methods of business conduct; to foster and secure better methods of instructing apprentices and clerks; to train those who have rather given their time to business details to look more thoroughly than before into the demands of education for themselves and their employés, and so to elevate the standard of pharmacy.

It should be the higher aim to gather under the auspices of the American Pharmaceutical Association, the facts of scientific research and knowledge that are constantly developing, and make *this* the practical scientific body which more fitly reflects the advanced status of pharmacy, and make its Proceedings the chosen receptacle of the best thought, research, and experiment, that it may have permanence and value.

In many of the States where pharmaceutical associations have been formed there now exist boards of pharmacy, organized under State laws, which have been aided by the action of the State association. Unfortunately, in a number of States the associations have failed to secure the passage of pharmacy laws.

During the present and preceding years such failures have occurred in Massachusetts, New York, Pennsylvania, Louisiana, Virginia, and possibly other States. So far as I have been able to procure statistics, pharmacy laws exist in the following States: Maine, New Hampshire, Connecticut, Rhode Island, New Jersey, West Virginia, North Carolina, South Carolina, Georgia, Alabama, Iowa, Illinois, Wisconsin, Missouri, and Kentucky; and in the cities of New York, Brooklyn, Philadelphia, Baltimore, Washington, Cincinnati, and San Francisco.

Pharmacy laws in the United States never can be made uniform. The feasibility of obtaining the favorable consideration of legislators to a fair, uniform pharmacy law is one of the possibilities of a later if not a "latter" day; but at present the literature of pharmacy laws is an entanglement of the mind in the mazes of legal enactments.

It seems that in the most of the boards of pharmacy there is a fair yet just and conservative rendering of the laws applicable to the subject.

From a correspondence with all the boards of pharmacy mentioned, I am led to believe that each board tries to faithfully execute the laws under which they are appointed. These laws vary, however, widely, in some cases permitting all in business to become registered; in others requiring an examination of all persons who have not been in business on their own account for a term of years.

Candidates are required to undergo an examination, usually before each member of the board to which he applies; and, on a comparison of replies to my inquiries I find that the lowest percentage at which any candidate can be passed successfully was 60 per cent., while in one or more boards they declined to pass any who fall below 80 per cent.

From the replies received by me from the boards of pharmacy, it would appear that on the first examination about 60 per cent. of the candidates are successful, the remaining coming up one or more times until successful or refused further examinations.

In some instances copies of questions used by the boards of pharmacy have been submitted to me for my own information on the subject, and it is fair to state that in every such case I have found them common-sense, practical questions, calculated to bring out knowledge rather than to surmise what the answer should be.

Under this incongruity of pharmaceutical legislation it seems almost impossible for boards of pharmacy to take any concerted action, save an agreement to increase the care exercised in questioning and valuing the replies of applicants examined.

To make the certificates of proficiency exchangeable in the several parts of the Union, to which their possessors might direct their footsteps, would seem to be not only impossible, but in some cases a positive error.

There should be a difference between the standing of one who has passed under a lax law and one who has been subjected to a critical examination, and both these should be of less value than the college diploma, which is a guarantee that its possessor has given the time to carefully pursue a pharmaceutical course of study, and has gained his honor after an examination that is usually a very thorough one.

The college graduate necessarily has the advantage in education and thoroughness. I would not be considered as disparaging boards of pharmacy or unduly extolling the college of pharmacy, but it seems a self-evident fact that the practical student with a college training is the man that will make the better mark in his life-work.

To-day I plead the cause of pharmaceutical education. I would call your attention to what the founders of this Association recorded at their meeting thirty years ago on this very subject:

"The subject of pharmaceutical education being considered of paramount importance by this Convention, and having been deliberated upon by its committee, the following resolutions have been adopted expressive of the sense of the Convention in reference to this important subject. It is *Resolved*,

"1st. That this Convention earnestly recommends to the practicing apothecaries in all sections of the United States, in places where they are sufficiently numerous, that they should organize themselves into societies for mutual improvement as pharmaceutists, for the encouragement of pharmaceutical literature by the formation of libraries, and for adoption of rules of conduct calculated to elevate the character of the profession among them.

"2d. That as schools of pharmacy are the most effectual aids to the student, this Convention respectfully recommends to pharmaceutists in all cities where they are numerous, to take measures for the establishment of such institutions as powerful means of improving the education of their assistants and apprentices, and thus benefiting themselves and the public.

"3d. That this Convention also recommends that more attention should be given by proprietors to the claims of apprentices or assistants, who are in course of study, as regards the facilities for learning, and the tuition which of right should proceed from them (the proprietors) in the absence of schools of pharmacy, especially in the provision of the best books of reference on the several subjects that claim the attention of students of pharmacy.

"4th. That in the opinion of this Convention it is desirable that apothecaries should be more generally careful, in taking pupils or apprentices, in reference to their fitness as regards natural endowments and preliminary education, believing that many persons who are now engaged in pharmacy and unfitted for its duties might thus have been prevented from misapplying their time and abilities in a profession for which they are not calculated."

Surely these resolutions of thirty years ago have the true spirit which should animate not only this Association collectively, but each member individually.

Boards of pharmacy are, or should be, only a means to an end. They are intended as a safeguard for the present time, a method only to weed out the utterly incompetent, but they are not now, nor were they ever intended to be, educational.

The pharmacy law of England enforces an examination much more rigid than is carried out here, but it would seem that even there, to a large extent, the education given in almost all the institutions have solely for their object the success of the candidate before the Board of Examiners, rather than a solid education.

Contrasting the educational establishment of the Pharmaceutical Society of Great Britain with the colleges of pharmacy of Philadelphia or New York, we would call the English organization, a financial failure. Its students are comparatively few as contrasted with the two colleges named, certainly not more than one-fourth in number, yet there can be no doubt that its course of instruction is thoroughly practical and sound.

Throughout Great Britain there have been established rival schools to "coach" or "cram" the applicants preparatory to the examinations.

Punch has aptly compared such teaching to the process by which water is charged with carbonic acid, and the examination to the removal of the cork, which lets out all the knowledge attained, and they are never able afterward to come up for an examination without being crammed all over again.

There are some who are born pessimists, who see no bright future in pharmacy; who are forever lamenting the days of the past, when the public were not so enlightened on facts relative to our business; when competition was not so sharp; when education and knowledge were not so necessary as now; who fear that business laws are tying them down as slaves to certain modes or business regulations, and they wish for the days of the past to be revived. No such lamentations are available. The present and the future have demands that must be met and conquered. The "sign of the times" is a sound and thorough education, one that will fully fit the young pharmacist to cope with the scientific problems of our business as well as the simple knowledge of cost and gain on his merchandise.

Those who have no soul above the merchandise side of our calling will ere long be left behind in the race, and it will be truly the "survival of the fittest."

Regarding the examinations of pharmaceutical students, a few words may be added. The records of the examinations in London show that fully one-half of the applicants fail on their first effort.

Doubtless the examinations are rigid, but from a careful examination of the papers with which I have been favored in the past I should say they were none too much so under the circumstances.

Of the large number of applicants but a small proportion fit themselves properly by education, but, seeking a shorter road, attend the establishments where they are forced into a superficial knowledge, and when the days of examination come they risk their success, usually as risky as successful.

The colleges of pharmacy in our land are acknowledged to be excellent in their methods of teaching. Those who attend their instructions may be classed as the more intelligent and promising of those who are growing up in the ranks of pharmacy. Yet even with the large numbers of those availing themselves of such education not one-tenth of the young men are attending our colleges of pharmacy. What is being done for the other nine-tenths? It is not my observation that employers, as a class, give themselves much trouble to advance the technical knowledge of their employés, being as a rule more anxious to have them know the money value than the properties of the commodities they handle.

The founders of this organization gave their views when they said:

"The subject of pharmaceutical education is considered of paramount importance."

The colleges of pharmacy were the originators of this Association; this in turn has been the originator of the State associations, and we may note that some of the recently organized colleges of pharmacy are the outgrowth of the State associations. There are none too many colleges; there is room for more, if they are only good ones and willing to maintain their standards of education and examination to equal in value those now adopted by the older colleges of pharmacy. If, however, such institutions are to be perverted to facilitate improper modes of procuring the insignia of competency without the substance, it should be our bounden duty to expose such schemes and take active measures to prevent their practices.

The colleges of pharmacy have nobly done their work, and have made American pharmacy an honored name throughout the world.

The future shall show even greater and better results as larger classes of students are coming into active life.

Our colleges should be sustained and encouraged by the active co-operation of every pharmaceutist who has that respect for his business that leads him to see in it something more than mere merchandise. Our colleges are the educators, our pharmaceutical associations the promoters of pharmacy, yet not only the fifteen hundred members of this Association but the five thousand members of our State associations should see to it that their valuable aid shall be given in the cause of pharmaceutical education; that they take active steps to send their young men to colleges of pharmacy that they may receive the solid foundation of a thorough education in their chosen profession.

Employers have also a duty to perform in another respect. It is the aid they can and should give their clerks in both theoretical and practical studies, and duty in their stores.

In doing this they are serving themselves as well as their employés, and yet, under a mistaken notion of thinking such time as taken away from that which should be devoted to more purely business duties, they dwarf their own knowledge and curtail the opportunities of their employés for becoming more thoroughly acquainted with the scientific branches of pharmacy.

The recommendations of the founders of this Association thirty years ago are reiterated to-day as fully expressing the needs now as then; it is just as true now as then, and no words of mine can more accurately express the great want of to-day.

Local pharmaceutical associations are being formed in many sections of our land. They ought to do, and are doing, good work for pharmacy. I have endeavored, during the past year, to secure some definite information as to all now in existence. It may be and is, I think, a valuable auxiliary to our work. I suggest and recommend that a special committee be appointed by the President, to report at the next annual meeting, on "Local Pharmaceutical Associations and their Work."

And now, gentlemen, in concluding, once more I congratulate you on the brilliant prospects of this meeting. If we are true to ourselves and the best interests of our Association, we will freely give the hours assigned to business their full attention. We will seek to transact all business promptly; will listen to and discuss the papers which have been elaborated for our edification, and refrain from all that will introduce discord or lack of unanimity in our proceedings. So shall this meeting, this place with its magnificent surroundings, be in our memory as one of delight to ourselves and a benefit to our associates.

The address was attentively listened to, and at its conclusion Dr. H. J. Menninger moved that the thanks of the Association be tendered to the President for his address, and that ex-Presidents Gordon, Markoe, and Bullock, be appointed a committee to report upon its suggestions. The motion was seconded by several members, and the question being taken by the Treasurer, Dr. C. A. Tufts, it was carried unanimously.

Mr. G. W. Kennedy, Chairman of the Council Committee on Membership, read the names of seventy-eight candidates for membership, whose applications had been previously examined by the Council, and approved for report to the Association. The list, containing also the vouchers, was afterwards posted up in the meeting-room for the scrutiny of the members.

Reports of committees being called for, the following were read by their titles, and laid upon the table for future action, namely, of the Committee on Papers and Queries, on Prize Essays, and on Legislation. Mr. L. Lehn, Chairman of the Committee on the Drug Market, was not present, but the secretary stated that the report would doubtless be received to-day or to-morrow.

The reading of the Report on Legislation being called for, it was read by J. M. Maisch, Chairman of the Committee (see p. 474), and on motion of Dr. H. J. Menninger, accepted and referred for publication. Mr. J. M. Good remarked that since the repeal of the St. Louis Pharmacy Act of 1874, and the enactment of the Missouri Pharmacy Law, in 1881 (see Proceedings for 1881, p. 385), no further legislation had been had in that State.

Mr. E. Lilly, Chairman of the Committee on Credentials, read the following report of this committee:

Your Committee on Credentials respectfully report, that the following named delegates have been properly accredited by their respective associations:

Massachusetts College of Pharmacy, Boston, Mass.—Henry Canning, S. A. D. Sheppard, B. F. Stacey,* E. S. Kelley,* F. H. Butler.

National College of Pharmacy, Washington, D. C.—W. S. Thompson, Charles Becker, G. G. C. Simms, J. R. Walton, W. G. Duckett.

St. Louis College of Pharmacy, St. Louis, Mo.—F. W. Sennewald, James M. Good, G. H. Charles Klie, Christ. G. F. Meyer, Charles O. Curtman, M.D.

Louisville College of Pharmacy, Louisville, Ky.—C. Lewis Diehl, John Colgan, Oscar H. Beckman, Edw. C. Pfingst, H. H. Rademaker.

College of Pharmacy of the City of New York.—H. W. Atwood, George J. Seabury, Gustav Balser, David Hays, T. J. Macmahan.

Pittsburg College of Pharmacy, Pittsburg, Pa.—L. Emanuel, S. Henry Stevens, W. C. E. Beyers, George A. Kelly, A. H. Wilson.

Cincinnati College of Pharmacy, Cincinnati, Ohio.—George Eger, J. H. Feemster, J. U. Lloyd, Charles Faust, H. H. Kœhnken.

Philadelphia College of Pharmacy, Philadelphia, Pa.—Alonzo Robbins, William McIntyre, William B. Thompson, Robert England, Adolph W. Miller.

Maryland College of Pharmacy, Baltimore, Md.—W. S. Thompson, Charles Caspari, Jr., Lewis Dohme, Joseph Roberts, D. M. R. Culberth.

Chicago College of Pharmacy, Chicago, Ill.—E. H. Sargent, Judson S. Jacobus, S. L. Coffin, R. H. Cowdrey, H. W. Fuller.

Ontario College of Pharmacy.—William Saunders, Edward Harvey, H. J. Rose, George Hodgetts.

New Hampshire Pharmaceutical Association.—Charles A. Tufts, Charles F. Hildreth, Elias S. Russell, Charles S. Eastman, Stephen F. Sanderson.

Kansas Pharmaceutical Association.—W. A. Stanford, George Slosson, Robert J. Brown.

Alabama Pharmaceutical Association.—P. C. Candidus, Charles A. Mohr, S. W. Gillespie, J. T. Savage, John Rison.

Rhode Island Pharmaceutical Association.—William B. Blanding, Stephen L. Talbot, A. B. Collins.

Pharmaceutical Association of the State of South Carolina.—Gust. J. Luhn, C. F. Panknin, A. W. Eckel, C. P. Aimar, E. S. Burnham.

Nova Scotia Pharmaceutical Society.—Frank C. Simson.

Wisconsin Pharmaceutical Association.—D. C. Griswold, F. S. Fenton, A. Conrath, H. C. Schranck, George Bauman.

West Virginia State Pharmaceutical Association.—Edmund Bocking, Charles Moenkemœller, A. N. Williams.

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* The names of Messrs. Kelley and Stacey were subsequently replaced by those of W. A. Chapin and W. A. Bell; see page 596.—SECRETARY.

Virginia State Pharmaceutical Association.—T. Roberts Baker, F. H. Masi, Polk Miller, T. F. Knock, H. W. Cole.

Pennsylvania Pharmaceutical Association.—George A. Kelly, George W. Kennedy, John F. Patton, W. F. Horn, Edward A. Cornell.

Ohio State Pharmaceutical Association.—E. M. Hatton, I. N. Reed, J. U. Lloyd, A. Mayell, Charles Huston.

North Carolina Pharmaceutical Association.—E. V. Zoeller, T. C. Smith, W. Simpson, J. G. M. Cordon, A. S. Lee.

New York State Pharmaceutical Association.—C. J. Powers, Louis Sauter, H. J. Menninger, F. F. Knapp, Thomas Stoddart.

New Jersey Pharmaceutical Association.—William Rust, Joseph Bassett, R. S. Parsons, James C. De Cou, Joseph R. Lippincott.

Missouri Pharmaceutical Association.—A. R. Edmonds, W. T. Ford, H. M. Pettit, P. H. Franklin, R. P. Miller.

Massachusetts State Pharmaceutical Association.—Arthur Hudson, T. B. Nichols, F. H. Butler, W. W. Bartlett, F. S. Whiting.

Kentucky Pharmaceutical Association.—C. Lewis Diehl, C. S. Porter, Samuel L. Curry, J. M Disque.

Georgia Pharmaceutical Association.—Joe Jacobs, John Ingalls.

Iowa State Pharmaceutical Association.—A. H. Miles, George B. Hogin, C. H. Ward, T. J. Rigg, Olaf M. Oleson.

Indiana Pharmaceutical Association.—George W. Sloan, Leo Eliel, Eli Lilly, Emmett Kannal, H. J. Watjen.

Connecticut Pharmaceutical Association.—Frederick H. Chapin, A. F. Wood, John C. Nichols, N. D. Sevin, H. J. Sperry.

Albany County Pharmaceutical Association, Albany, N. Y.—Albert B. Huested, S. E. Ullman, Gustavus Michaelis.

Indianapolis Association of Pharmacists, Indianapolis, Ind.—J. B. Dill, J. K. Lilly, George W. Sloan, S. Muehl, M. C. Staley.

Mobile County Pharmaceutical Association, Mobile, Ala.—J. C. Du Bose, P. C. Candidus, E. P. Braun, Charles A. Mohr, Thomas F. Moore.

Kings County Pharmaceutical Society, Brooklyn, N. Y.—Edward R. Squibb, Grenville M. Baker, Louis E. Nicot, Lithgow T. Perkins, W. P. De Forrest.

Toledo Pharmaceutical Association, Toledo, Ohio.—I. N. Reed.

Richmond Pharmaceutical Association, Richmond, Va.—Hugh Blair, Henry Bodeker, John W. Pierce, Jesse Child, T. Roberts Baker.

Newark Pharmaceutical Association, Newark, N. J.—S. L. Rumsey, W. H. Sayer, R. E. Parsons, Charles Holzhauer, Jacob Betzler.

Monroe County Pharmaceutical Association, Rochester, N. Y.—S. A. Newman, Henry Aman, ——— Schmitt, E. H. Dawes, W. Smith.

Lancaster County Pharmaceutical Association, Lancaster, Pa.—A. B. Corcoran, H. E. Parry, William A. Maulick, Charles A. Heinitsh.

Literary and Scientific Society of German Apothecaries of the City of New York.—Ernest Reusch, Gustav Balser, A. S. Bischof, C. Eimer, H. J. Menninger.

Cleveland Pharmaceutical Association, Cleveland, Ohio.—E. A. Schellentrager, A. Mayell.

Erie County Pharmaceutical Association, Erie, Pa.—Thomas Stoddart, J. Reiffenstahl, H. P. Hayes, W. H. Tibbs, Mil McEachrew.

Alumni Association of the College of Pharmacy of the City of New York.—Frank F. Knapp, Will De Lano, Benjamin F. Hays, Oscar E. Dudley, Clarence F. Booth.

Alumni Association of the St. Louis College of Pharmacy, St. Louis, Mo.—Ferd. G. Uhlich, Otto A. Wahl, Charles Gittner, Oscar Heitmyer, J. W. Tomfohrde.

Alumni Association of the Philadelphia College of Pharmacy, Philadelphia, Pa.—Joseph Jacobs, Henry Trimble, George W. Kennedy, William Webber, John A. Witmer.

Alumni Association of the Massachusetts College of Pharmacy, Boston.—G. F. H. Markoe, B. F. Davenport, William W. Bartlett, George F. Dinsmore, Freeman H. Butler.

Alumni Association of the Chicago College of Pharmacy, Chicago, Ill.—Thomas Whitfield, H. W. C. Martin, R. H. Cowdrey, F. G. Sommers, Fred. M. Schmidt.

Alumni Association of the Louisville College of Pharmacy, Louisville, Ky.—O. A. Beckman, O. E. Mueller, W. F. Tafer.

We also respectfully report that we have not been able to satisfy ourselves that the delegates of the Western Wholesale Drug Association are entitled to recognition, and we therefore beg to refer this subject to the consideration of the meeting.

All of which is respectfully submitted.

ELI LILLY,
Chairman.
P. C. CANDIDUS,
ADOLPH W. MILLER.

MR. MCELHENIE, Brooklyn, New York.—I would state that there are no delegates here from the Kings County Society.

MR. MENNINGER.—I move to amend the report of the committee so that Mr. Thomas D. McElhenie and Joseph J. Underhill be recognized as delegates from the Kings County Society, as there are no other members of the delegation appointed present. I know Messrs. McElhenie and Underhill as members in good standing, and therefore offer the motion that they be recognized as delegates.

MR. MCELHENIE.—There is a provision in the Kings County Society's constitution that prevents any one acting as a delegate unless appointed as such.

MR. MENNINGER.—I do not see the cogency of that reason. We are not the Kings County Society, and can recognize whom we please in that respect, and I do not think it is any discourtesy to the Kings County Society to recognize two of its members who are present on the floor as any other member of any other society would be recognized. I am sure that no one of that society would feel such action to be discourtesy, but on the contrary.

THE PRESIDENT.—You have all heard the motion offered by Mr. Menninger that the names of Thomas D. McElhenie and Joseph J. Underhill be recognized as delegates from the Kings County Pharmaceutical Society.

THE SECRETARY.—I beg pardon, but I believe this is entirely irregular. I do not see what right the Association has to say who shall represent that society. These credentials here have been signed by the officers of the Kings County Society, and the secretary of the latter has altered the printed form so that only the delegation is authorized to fill vacancies. Now if a portion of the delegation is here they may fill vacancies, but I do not think it is competent for this Association to say who shall act as delegates in case of the absence of every one of the delegates appointed.

T. ROBERTS BAKER, Richmond.—I agree entirely with Professor Maisch in relation to the question which has been raised. I think that we should proceed in order. I am speaking to the question solely and in reference to the principle involved, and not in reference to any personality. Now I do say if the society wants to be represented here it is very easy for them to be so represented here by electing delegates in a proper manner, and then these can come. Any gentleman of that delegation, if authorized to put others in the places of absentees, can easily do so, but if no one is willing to come, that ends the matter altogether. I speak to the rules of order, and hope, sir, it will not be the pleasure of this Association to carry that motion.

Mr. Menninger.—I recognize the technical position taken by the Secretary, and I withdraw my motion.

The President.—The motion is withdrawn, and no further action is necessary.

Mr. S. A. D. Sheppard, Boston.—I move to amend the report by substituting for the names of Messrs. Kelley and Stacey, in the delegation of the Massachusetts College of Pharmacy, Messrs. W. A. Chapin, and W. A. Bell, and Thomas A. Price, Salem, the credentials having been sent, but failed to reach the committee.

The Secretary.—If that is the action of the delegates, all they have to do is to report it.

Mr. Cowdrey, Chicago.—I rise to ask one question as to what we shall do in the case of the Illinois State Pharmaceutical Association, as the delegates appointed by the Association have not yet put in an appearance or sent any credentials, thus leaving the Illinois State Association without any representation at all.

The President.—I should say in answer to that question that if they are not represented here and have sent no credentials, there is no one here authorized to do anything for them; but when the credentials arrive they can be presented at any time in due form. I do not think that anything could be done about it.

A motion that the report of the Committee on Credentials be received and accepted was made, duly seconded, and adopted.

Mr. Remington.—That does not carry the adoption of the report.

The President.—It does not adopt it. There is an unfinished matter, upon which the sense of the Association will have to be taken, with reference to the Western Drug Association.

Mr. Remington.—That is the matter to which I was about to refer. Our by-laws provide for and specify that local organizations of pharmacists shall be entitled to send delegates, and how they may become members of the Association by signing the constitution, etc. Personally, I have no objection whatever, but think it would be well, indeed, for this delegation to participate in our deliberations, and make a motion that they be thus invited, but I do not think that the gentlemen can be received as delegates under our by-laws.

The President.—You have heard the remarks of Professor Remington in regard to the delegates from the Western Wholesale Druggists' Association. He has stated the requirements of the by-laws as regards who shall be entitled to send delegates. It does not appear that the members of the Western Wholesale Druggists' Association are pharmacists, but wholesale druggists or dealers, and under our by-laws they would not be legally entitled to representation in this body. You have also heard his motion, which has been seconded, that they be invited to participate in the deliberations of this meeting.

Mr. Roberts, of Baltimore.—I would like to ask in what degree these gentlemen are invited to participate in our proceedings. If they participate in our proceedings fully they become really members by delegation. I merely wish to know whether they have the right to vote or not.

THE PRESIDENT.—That does not include the right to vote, by any means.

MR. REMINGTON.—In participating in the deliberations they should not have the right to vote.

THE PRESIDENT.—Only the courtesy of the floor?

MR. REMINGTON.—Yes, sir.

MR. MENNINGER.—I move to amend that they be invited to participate in the discussions on pharmaceutical subjects at this meeting.

MR. REMINGTON.—I accept Mr. Menninger's amendment.

THE PRESIDENT.—The amendment is accepted by the original mover, and the motion is that the delegates from the Western Wholesale Druggists' Association be invited to participate in the discussion of pharmaceutical subjects on this floor.

MR. MCKELWAY, Philadelphia.—I move to amend by adding the words: On any subjects which may properly come before the Association.

THE PRESIDENT.—This amendment is not seconded.

MR. ROSENWASSER, Cleveland.—Do I understand you that this Association will not allow the wholesale druggists to be represented? I do not quite understand the ground taken.

THE PRESIDENT.—We cannot receive them, according to our by-laws, as delegates. Delegates must come from pharmaceutical organizations. This delegation does not come from what might be called a pharmaceutical body, but from wholesale dealers; that is what they call themselves, and the association which they represent is virtually a wholesale druggists' association, not an association of pharmacists.

MR. ROSENWASSER.—The distinction between pharmacists and druggists seems to me to be one more in degree than one in actual fact, and on that account I cannot see how we can separate druggists from pharmacists.

THE PRESIDENT.—Mr. Rosenwasser will pardon me for one moment. A society of wholesale druggists has no right to any representation in this organization, but the by-laws particularly state that delegations must come from pharmaceutical bodies, and the question has been time and again brought up and that ruling has been adhered to. Unless overruled by a vote of the Association, I shall hold that ruling now.

The question was then taken on Mr. Remington's motion that the representatives of the Western Wholesale Druggists' Association be invited to participate in the discussions on pharmaceutical subjects at this meeting, and it was carried without opposition. The report of the committee, thus completed, was, on motion of Mr. Diehl, seconded by Mr. Saunders, adopted, and the delegations of the various local pharmaceutical associations admitted.

THE PRESIDENT.—The motion has been adopted, and the members present here from the Western Wholesale Druggists' Association are very cordially welcomed to participate in the deliberations of a pharmaceutical character on this floor. An invitation is also extended to the delegates from other associations who have not heretofore met with us. I am sure that we all are glad to see them and to welcome all new pharmaceutical organizations to our deliberations.

Mr. Richardson, St. Louis (representing the Western Wholesale Druggists' Association).—Mr. President: As a member of the American Pharmaceutical Association I would say that there seems to be some little misunderstanding as to the purpose of the Western Wholesale Druggists' Association in sending a committee, of which I have the honor to be the chairman, here to meet you with a fraternal feeling. Being an organization working somewhat in the same field with yourselves, the Western Wholesale Druggists' Association thought fit to send a committee to you to convey to you our cordial and cheerful congratulations, to tender to you our kindly regards, to assure you of our great sympathy in the work in which you are engaged, and to urge you forward, if possible, to more persistent labors and to higher aims than you have already achieved. Our organization, Mr. President, is similar to your own, as I have just remarked. Our field of labor is somewhat the same as your own. Perhaps our work is in different paths, but in the same field, and we sympathize with you in the generous efforts which you are making to build up and make respectable the practice of medicine and pharmacy and the handling of the goods which are connected with our business. Our purpose has been in a business direction. In this branch of business we have endeavored to build up among the members of the Western Wholesale Druggists' Association,—and I will say here that it is no longer a Western Wholesale Druggists' Association, but it has become virtually an association of the United States,—I say we have endeavored to build up in that association, where before was isolation and distrust, a generous feeling of confidence among men who are engaged in distributing the drugs of the pharmacist, and I am happy to say that the number who have not responded to this generous sentiment is comparatively insignificant. And now, gentlemen, looking at the whole field for a brief moment, we find you not combating with a business disagreement and entanglement which follow it, but your field is that of scientific investigation, where roads are difficult but not dangerous, and I congratulate you that you have none of those difficulties to contend with that we have to meet and contend with in our organization. We are sent here, gentlemen, to offer you our hearty congratulations, to cheer you on in your labors, and to hope that hereafter these two organizations, knowing each other,—and that is the purpose of our coming here to-day,—we shall co-operate in all our labors, and that the goods which are carefully examined by your scientific skill shall be as carefully dispensed throughout the country. Before I sit down, Mr. President, I desire on behalf of the organization which I have the honor to represent, to express the hope that this organization will appoint a similar committee to meet us in a spirit of fraternal goodwill when we meet in Cleveland in November next. (Great applause.)

The Secretary then commenced to read the roll, when Mr. Charles Bullock moved that the further reading of the roll be dispensed with. This motion was agreed to.

The appointing of the Nominating Committee being next in order, the President called upon the various delegations accredited to this meeting, by whom the following gentlemen were selected to serve on this Committee:

Massachusetts College of Pharmacy,	F. H. Butler.
National College of Pharmacy, Washington, D. C.,	Charles Becker.
St. Louis College of Pharmacy,	J. M. Good.
Louisville College of Pharmacy,	H. H. Rademaker.
College of Pharmacy, City of New York,	T. J. Macmahon.
Pittsburgh College of Pharmacy,	George A. Kelly.

Cincinnati College of Pharmacy,	J. H. Feemster.
Philadelphia College of Pharmacy,	William McIntyre.
Maryland College of Pharmacy,	Joseph Roberts.
Chicago College of Pharmacy,	Judson S. Jacobus.
Ontario College of Pharmacy,	William Saunders.
New Hampshire Pharmaceutical Association.	Charles A. Tufts.
Kansas Pharmaceutical Association.	W. A. Stanford.
Alabama Pharmaceutical Association,	P. C. Candidus.
Rhode Island Pharmaceutical Association,	William B. Blanding.
South Carolina Pharmaceutical Association.	G. J. Luhn.
Nova Scotia Pharmaceutical Society,	Frank C. Simson.
Wisconsin Pharmaceutical Association,	D. C. Griswold.
West Virginia Pharmaceutical Association,	Edmund Boeking.
Virginia State Pharmaceutical Association,	H. W. Cole.
Pennsylvania Pharmaceutical Association,	E. A. Cornell.
Ohio State Pharmaceutical Association,	E. M. Hatton.
North Carolina Pharmaceutical Association,	E. V. Zoeller.
New York State Pharmaceutical Association,	C. J. Powers.
New Jersey Pharmaceutical Association,	Joseph Bassett.
Missouri Pharmaceutical Association.	H. M. Pettit.
Massachusetts State Pharmaceutical Association.	T. B. Nichols.
Kentucky Pharmaceutical Association,	C. S. Porter.
Georgia Pharmaceutical Association,	John Ingalls.
Indiana State Pharmaceutical Association,	George W. Sloan.
Connecticut Pharmaceutical Association,	A. F. Wood.
Albany Pharmaceutical Association,	A. B. Huested.
Indianapolis Association of Pharmacists,	Josiah K. Lilly.
Toledo Pharmaceutical Association,	I. N. Reed.
Richmond Pharmaceutical Association,	T. Roberts Baker.
Lancaster County Pharmaceutical Association.	C. A. Heinitsh.
New York German Apothecaries,	Ernest Rausch.
Cleveland Pharmaceutical Association,	A. Mayell.
Erie County Pharmaceutical Association,	W. H. Tibbs.
Alumni Association New York College of Pharmacy	C. F. Booth.
Alumni Association St. Louis College of Pharmacy.	J. W. Tomfohrde.
Alumni Association Philadelphia College of Pharmacy.	Henry Trimble.
Alumni Association Massachusetts College of Pharmacy	George F. H. Markoe
Alumni Association Chicago College of Pharmacy.	Robert H. Cowdrey.
Alumni Association Louisville College of Pharmacy.	O. A. Beckman.

Of the delegates of the Mobile County Pharmaceutical Association, Mr. P. C. Candidus alone was present, who had been named for representing the Alabama Pharmaceutical Association. No delegates appeared to be present of the Pharmaceutical Associations of Iowa, Kings County, Newark, and Monroe County; and a motion was agreed to that on the arrival of representatives of these societies, they should be permitted to name one delegate each to attend to the committee work.

In addition to the above, the President appointed the following five members of the Association to act on the Nominating Committee: J. A. Lee, New Iberia, La.; J. F. Llewellyn Mexico Mo.; T. W.

Schryer, Cumberland, Md.; W. S. Robinson, Yorkville, Ontario; C. M. Driggs, White Haven, Pa.

The President likewise appointed the following Committee on Exhibits: William B. Thompson, Philadelphia, Chairman; Theo. Schumann, Atlanta, Ga.; J. W. Caldwell, Detroit, Mich.; T. J. Casper, Springfield, Ohio; and George Eger, Cincinnati.

MR. MENNINGER: I now move that we adjourn to meet to-morrow morning at nine o'clock.

MR. CHARLES BULLOCK: Before that motion to adjourn is put I would like to express the great satisfaction we have had in listening to the remarks of Mr. Richardson, of St. Louis. Those who remember the early history of this Association and the labor connected with its foundation will recollect that it was largely done by men who were extensively engaged in the wholesale and importing business. Now after the lapse of nearly thirty years we have the wholesale trade coming to us from the far West asking the reception of delegates from them to represent their interests in this Association, and although we are precluded by the technical expression of our by-laws from accepting them as such I feel as if I could not let the occasion pass without saying that I am glad to find the wholesale trade is now coming to recognize the influence of this Association upon all which is good in its effect upon the drug trade, either in the retail or the wholesale departments, and I have been particularly struck with the fact that many of our founders were men who were engaged in that very department of business, although some of them combined with that business that of the retailing or dispensing of drugs also. (Applause.)

THE PRESIDENT: Before that motion to adjourn is put I will make a remark. It has been observed that the arrangement for business and pleasure at this meeting is such as to call for only one session daily, and you will find upon the programmes that have been distributed that the meeting is to be called to order at nine o'clock each morning. It is earnestly hoped that whatever be the hour at which the meeting is called that the members will be present punctually in order that we may adjourn at such time as may be proper that other matters of pleasure may not be interfered with, and that we may also carry on the business satisfactorily for which we have assembled. A motion has been made by Dr. Menninger that we now adjourn until to-morrow morning at nine o'clock.

The motion was seconded and agreed to.

Second Session.—Wednesday Morning, September 13th.

The meeting was called to order by the President, and the minutes of the first session were read by the Secretary and approved. Mr. Cowdrey read the following Report of the Nominating Committee:

Your Committee met at 8.30 P.M., and, a quorum found to be present, the following nominations were made:

President.

Charles A. Heinitsh,	Lancaster, Pa.

First Vice-President.

John Ingalls,	Macon, Ga.

Second Vice-President.

Louis Dohme,	Baltimore, Md.

Third Vice-President.

William B. Blanding,	Providence, R. I.

Treasurer.

Charles A. Tufts,	Dover, N. H.

Permanent Secretary.

John M. Maisch,	Philadelphia, Pa.

Reporter on Progress of Pharmacy.

C. Lewis Diehl,	Louisville, Ky.

Members of the Council.

S. A. D. Sheppard,	Boston, Mass.
William Saunders,	London, Canada.
William S. Thompson,	Washington, D. C.

Committee on Drug Market.

George W. Sloan,	Indianapolis, Ind.
James G. Steele,	San Francisco, Cal.
W. H. Wickham,	New York, N. Y.
I. L. Lyons,	New Orleans, La.
J. P. Muth,	Baltimore, Md.

Committee on Papers and Queries.

J. U. Lloyd,	Cincinnati, O.
A. Mayell	Cleveland, O.
W. W. Bartlett,	Boston, Mass.

Committee on Prize Essays.

C. Lewis Diehl,	Louisville, Ky.
John F. Judge,	Cincinnati, O.
Emil Scheffer,	Louisville, Ky.

Committee on Legislation.

John M. Maisch,	Philadelphia, Pa.
Samuel A. D. Sheppard,	Boston, Mass.
Charles Mohr,	Mobile, Ala.

Signed, Robert H. Cowdrey,
Secretary, Nominating Committee.

On motion of Mr. Bullock, amended by the Secretary, the report of the Nominating Committee was accepted, and the Association proceeded to ballot for President. The Chair appointed Messrs. Frank Harrington, of Ohio, and J. H. Cool. of New York, tellers, who reported the unanimous election of Mr. Charles A. Heinitsh, of Lancaster, Pa., President for the ensuing year.

While the ballot was being taken, the Secretary of the Council read the names of 32 candidates for membership, whose applications and vouchers had been examined by the Council.

On motion of Mr. Bullock, the Permanent Secretary was directed to deposit an affirmative ballot for the remaining officers, members of committees and of Council, as reported by the Nominating Committee, and this having been done, the nominees were declared to have been duly elected.

The President appointed ex-presidents Saunders and Bullock to conduct the President elect to the chair, and introduced the latter with the following remarks :

President Bedford.—Gentlemen of the American Pharmaceutical Association: I take great pleasure in introducing to you as my successor, one of the most worthy, active, and useful members of our Association, Mr. Charles A. Heinitsh, of Lancaster, Pa., who, I have no doubt, will serve you well and faithfully during the coming year. To no one would I yield my office with greater pleasure than my honored friend, Mr. Heinitsh.

President Elect Heinitsh: In assuming this high position, which your kindness and partiality has bestowed upon me, I do it with no small amount of distrust and trepidation. I had hoped and preferred that this mantle of honor would be given to some other member, better qualified and more deserving; but as you have willed otherwise, may I say, I accept it as a compliment to the State in which the Association was organized, and to the older membership. Conscious of my own deficiencies, I ask your kind forbearance for any errors that may be committed, and your cordial support and assistance in endeavoring to discharge the responsible and important duties of the office.

President Bedford requested Ex-Presidents Gordon and Markoe to conduct the Vice-Presidents elect to their Chairs. The Third Vice-President, W. B. Blanding, being the only one present at the time, was introduced, and returned his thanks for the honor conferred upon him. President elect Heinitsh then assumed the duties of his office.

The Secretary stated that the credentials of the delegation of the Illinois Pharmaceutical Association, accrediting Messrs. A. W. H. Reen, M. Williams, R. C. Hattenhauer, W. W. Marmon, and J. S. Fisher, had been placed upon his desk, and moved that the delegates be admitted, which motion was adopted.

The Secretary read the following telegram :

SAN FRANCISCO, September [illegible] 1882.

TO THE SECRETARY OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, NIAGARA FALLS:

California sends fraternal greeting, and renews the invitation to hold the annual meeting in San Francisco.

(Signed) EMLEN PAINTER,
President California Pharm. Association.

It was stated by the Secretary that Professor Painter had intended to be present at this meeting, but was prevented by sickness and death in his family.

The Secretary further read a letter from the Louisiana State Pharmaceutical Association, inviting the Association to hold its next annual meeting in New Orleans, and stated that the Association had standing invitations from Cincinnati, and Washington, D. C., to hold its meetings in these cities. A series of resolutions, embodying an invitation, passed by the City Council, of Atlantic City, N. J., was likewise handed in, and was, on motion, together with all other invitations that may be received, referred to a committee to be appointed by the Chair.

The First Vice-President elect, Mr. John Ingalls, of Georgia, was introduced by the President, and briefly addressed the Association.

Mr. Kennedy, Secretary of the Council, read the minutes of the six meetings of this body held since August 25th, 1881. These minutes give the following information:

Two of the photographic albums of the Association, which according to resolutions passed in 1872 and 1877 (see Proceedings, 1872, p. 95, and 1877, p. 608), are to be in the custody of the Permanent Secretary, have been received by that officer.

At the International Pharmaceutical Congress, held in London, in 1881, an International Pharmacopeia Commission was appointed, and John M. Maisch was elected to represent the United States of America. As the second member from this country, to be elected by the Pharmaceutical Association, Charles Rice, of New York, and C. Lewis Diehl, of Louisville, were nominated, and the former elected by eleven votes of the Council to six for Professor Diehl. Dr. Rice had signified his willingness to serve in this capacity.

A consultation had been held with the Committee on Entertainments, and this committee was requested to take also charge of all railroad arrangements to be made for the Thirtieth Annual Meeting, and to consider all necessary details in regard to the feasibility of holding, in the near future, a meeting in San Francisco.

A phototype picture of the late Charles W. Badger had been procured for the last volume of Proceedings, and a plan for using the income from the Centennial Fund had been adopted in compliance with a resolution passed last year. (See Proceedings, 1881, pp. 512 and 549.)

An amendment was recommended to chapter vi., art. ix., of the by-laws of the Association, with the object in view of publishing "a complete synopsis of the minutes of the Council," instead of the entire minutes.

The Chairman of the Finance Committee was instructed to examine the accounts and vouchers of the Treasurer at least two weeks before the annual meeting, and his travelling expenses incurred in attending to this duty were ordered to be paid.

The Chairman of the Finance Committee, Mr. S. A. D. Sheppard, made the following recommendations, which were approved:

1. That the Treasurer deposit all moneys received with the New England Trust Company of Boston, or some other reliable banking company, where the money may be drawing interest.

2. That the money be deposited in the name of the American Pharmaceutical Association, and made payable to the order of the Treasurer.

3. That all bills be paid only by numbered checks, said checks afterwards to be attached to the vouchers.

4. That a deposit be made whenever the money in the Treasurer's hands amounts to fifty dollars.

5. That the Treasurer balance his books January 1st, 1883, and make out, previous to February 1st, 1883, his annual report for the financial year 1882.

6. That all his books, accounts, vouchers, etc., together with the report, be sent by express to the Chairman of the Finance Committee in February.

7. That said books, etc., be returned to the Treasurer within two weeks.

8. That in February, 1883, a meeting of the Finance Committee be held, and that the travelling and other necessary expenses of said committee be paid by the Association.

9. That the Finance Committee carefully examine all the books, accounts, funds, etc., of the Treasurer, and previous to March 1st report thereon, in writing, to the Chairman of the Council.

10. That separate ledger accounts be kept with the Ebert Fund, the Centennial Fund, and the Life Membership Fund, to be balanced at the end of each financial year.

11. That the interest received on account of the several funds be deposited as soon as received, and that such balance, whenever accumulated to a sufficient amount, be used for purchasing a one hundred dollar registered government bond, to be kept with the other bonds belonging to such fund.

The recommendation that the Finance Committee consist of three (instead of five) members was adopted.

The Treasurer's accounts were audited by a committee.

The Entertainment Committee had considered the invitation from San Francisco, and concluded that it would be unwise to meet there before 1885, and that it was questionable whether it would then be prudent, owing to the expense and time consumed. On motion of Mr. Sheppard, it was declared to be the sense of the Council that if suitable arrangements could be made, the Association meet in San Francisco within the next three years.

Amendments to the by-laws of the Council were adopted as follows:

Chapter v., article ii., add after the words, "the publication," the words "and distribution.'

Chapter x. (new). Every proposition to alter or amend these by-laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the votes of three-fourths of the members present it shall become a part of these by-laws.

Israel J. Grahame, of Philadelphia, who has been a member since 1856, and for several years prostrated by sickness, was placed upon the roll as life member.

On motion of Mr. Gordon, the Treasurer was instructed to draw upon all members, three years or more in arrears, after having previously notified them, these drafts to be made November 1, 1882.

Starr H. Ambler, of New York, was requested to resign.

The Committee on Membership having been empowered at the meeting of April 6th, 1882, to issue about 10,000 circulars to pharmacists and druggists who are not members of the Association, at a cost not exceeding $200, expended of the amount appropriated $183.20.

On motion of Mr. Saunders, Dr. William B. Carpenter, of London, the eminent physiologist, was invited to attend the meetings of the Association.

The minutes of the Council, as read, were approved. The proposed amendment to Chapter VI., Article IX., lies over, under the rules, to a subsequent session for action.

The minutes likewise gave information of the election of the following new members, whose applications had been reported at the first session:

California.

John H. Dawson, San Francisco.
Edwin Wolcott Joy, San Francisco.
Edward A. Preuss, Jr., Los Angeles.
William M. Searby, San Francisco.

Connecticut.

Willis Benedict, New Haven.
Walter R. Francis, New Haven.
J. Lacy Melvin, Westville.

Illinois.

Edmund Knœbel, Highland.

Indiana.

John N. Hurty, Indianapolis.
Winfield S. Lynn, Indianapolis.
Joseph A. Mehringer, Jasper, Dubois Co.
Florian C. Schmidt, Evansville.

Iowa.

Charles Truax, Cedar Rapids.

Kansas.

George Slosson, Coffeyville.

Kentucky.

Chiton Scott Porter, Eminence.
Albert John Schœttlin, Louisville.
William Theodore Springer, Louisville.

Louisiana.

Alexander G. Frere, Franklin.
Christian Lewis Keppler, New Orleans.

Maine.

Henry F. Libby, Pittsfield.

Maryland.

Clarence H. Risk, Baltimore.
Colin F. Stam, Chestertown.

Massachusetts.

Joseph Webster Colcord, Lynn.
James S. Moore, West Stockbridge.
Charles H. Price, Salem.
Charles A. Siegemund, Boston.

Michigan.

Theodore J. Wrampelmeier, Ann Arbor.

Minnesota.

Daniel R. Noyes, St. Paul.
Adolph Stierle, St. Paul.

Missouri.

Woodville Browning, Hopkins.
James Richardson, St. Louis.
F. H. Westmann, St. Louis.

New Jersey.

Charles H. Dalrymple, Morristown.
Frank H. Slater, Matawan.
Isaac W. Turner, Jersey City.

New York.

S. J. Bendiner, New York.
Francis M. Bishop, Holley.
James Harris Cool, Palmyra.
James Feeny, Stapleton, L. I.
Peter Perry Hazen, Cornwall.
John Hurley, Little Falls.
James Alanson Owens, Rome.
Charles J. Powers, Syracuse.
Arthur H. Rogers, Geneseo.
Charles W. Rolph, Castile.
Emanuel Rommel, Suspension Bridge.
Edward H. Squibb, Brooklyn.
William L. Sweet, Pike.

Ohio.

Albert Adolph, Columbus.
John H. Asplin, Cleveland.
James I. Benedict, Cleveland.
James Bruce. Cleveland.
Virgil Coblentz, Springfield.
Louis A Haber, Cleveland.
James F. S. Hagemann, New Madison.
George Louis Hechler, Cleveland.
Fred. W. Herbst, Columbus.
George B. Kaufman, Columbus.
Hugo F. Linden, Cleveland.
Daniel Myers, Cleveland.
Richard Parsons, Cleveland.
Louis W. Sauer, Cincinnati.
George Mathias Schambs, Cleveland.
E. A. Schellentrager, Cleveland.
Lewis Walker Sherwood, Columbus.
Harvey N. Siegenthaler, Springfield.
Frank W. Slosson, Cleveland.
Albert Smithnight, Cleveland.

Pennsylvania.

T. F. Cummings, Scottdale, Westmoreland County.
John Murry McNeil, Scottdale, Westmoreland County.
Bernard James Murray, Philadelphia.
Lemuel A. Ridgway, Mansfield, Tioga Co.
Lawrence Wolff, Philadelphia.

Virginia.

Thomas Franklin Knock, Petersburg.
Oscar Ernest Thomas, Richmond.

Washington Territory.

Gardner Kellogg, Seattle.

West Virginia.

Clarence A. Potterfield, Charleston.

Ontario, Canada.

Robert Samuel Priddy, Windsor.

The following documents coming from the Council were read:

REPORT OF COMMITTEE ON PUBLICATION.

The Committee respectfully reports that the manuscript for the last volume all came to hand by December 9th, 1881, but, through a misunderstanding, a large number of cuts were not received until December 26th. The publishers of "New Remedies" and of the "American Journal of Pharmacy" have, as heretofore, furnished free of charge, the former 32 and the latter 15 cuts; 8 cuts were loaned by the publishers of the "Druggist;" over 40 cuts were obtained through the publishers of the "Oil and Drug News" at a small expense; and several more were engraved to order.

The twenty-ninth volume of Proceedings was published at the following expense:

Phonographic report,		$100 00
Composition, paper, printing,		1552 08
Binding and wrapping,		312 80
Phototype,		82 00
Journals for use of Reporter on Progress of Pharmacy:		
For 1881,	$35 62	
For 1882,	12 38	
		48 00

Woodcuts,		$32 00
Incidental expenses of the Secretary :		
Telegrams,	$2 00	
Packing-boxes, paper, etc.,	9 25	
Freight and expressage,	64 18	
Postage stamps,	124 00	
Circulars, stationery, etc.,	11 50	
		210 93
Salaries of Reporter and Secretary,		1100 00
Total,		$3437 81

The Proceedings were all distributed about the middle of May, partly through the mails and partly through the authorized agents.

The following stock of Proceedings is on hand, stored at the Philadelphia College of Pharmacy:

1851.	307 in paper.				
1852.	82	"			
1853.	83	"			
1854.	56	"			
1855.	99	"			
1857.	247	"	15 bound.		
1858.	55	"	7	"	130 loose.
1859.	—	"	38	"	
1860.	—	"	200	"	
1862.	—	"	275	"	
1863.	—	"	265	"	
1864.	177	"	112	"	
1865.	152	"	24	"	
1866.	66	"	77	"	
1867.	151	"	84	"	

1868.	54 in paper.		151 bound.	
1869.	100	"	143	"
1870.	111	"	93	"
1871.	96	"	56	"
1872.	99	"	4	"
1873.	16	"	98	"
1874.	130	"	24	"
1875.	65	"	38	"
1876.	42	"	45	"
1877.	48	"	69	"
1878.	63	"	105	"
1879.	23	"	90	"
1880.	82	"	41	"
1881.	50	"	65	"

The insurance on the above and other books remains the same as for a series of years past, it being $2500, in the German Fire Insurance Company of Philadelphia, at a premium of $15.

Joseph P. Remington,
C. Lewis Diehl,
W. J. M. Gordon,
John M. Maisch.

REPORT OF COMMITTEE ON FINANCE.

The Committee on Finance would make the following report: That, in a general way, the finances of the Association appear to be in good condition. Owing to the fact that the members of the committee reside at long distances from each other, no meeting of the committee has been held. It seems very desirable that there should be at least one meeting of the Finance Committee each year; that such meeting be not held at the time of the Annual Meeting of the Association, but at some time in the year when the committee would be able to give as much time and attention to so important a subject as it certainly needs and deserves. At the time of the Annual Meeting such attention cannot well be given. To accomplish the desired end your committee recommend that when the Finance Committee for next year be appointed it shall be composed of members who reside in comparative proximity to each other; that they be instructed to hold at least one meeting during the year; that the necessary expenses for one meeting of the committee be defrayed by the Association; that they shall, at that meeting, make a careful examination of all the financial matters of the Association, and make a report thereon, in writing, to the Council, with such recommendations as they deem desirable. It is to be hoped that our Association will annually increase in numbers and interest, and, if such be the case, its funds should each year become greater, and, consequently, demand more attention. We have now three permanent funds; they are signs of prosperity. We hope that two of them, at least, will increase very largely. The plan adopted of late of making a smaller book of the volume of the Proceedings certainly commends itself, from the fact that our cash balance is thereby increased at the end of the year.

For Finance Committee,
S. A. D. SHEPPARD,
Chairman.

REPORT OF THE TREASURER.

TO THE OFFICERS AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

GENTLEMEN: In conformity with the requirements of the Constitution, I herewith present a report of the transactions of this office for the past year. All the bills duly presented to me have been paid, and there is a balance in the treasury of $1981.10. In addition the Association has the Ebert Fund, $500; the Centennial Fund, $1117.81, and the Life Membership Fund of $685. These funds are invested in four per cent. government bonds, the details of which will be furnished the Auditing Committee.

In response to a circular sent by the Treasurer two years ago, twelve members became Life Members under the new rule. I regret I cannot report as large an increase at this time. Several members have informed me that they have the subject under consideration. The members will please not to take it amiss if the Treasurer by circular again calls their attention to this important subject, and we trust that the seed sown may bring forth a good harvest.

A goodly number of members pay soon after the bills are presented; others defer until again called upon; and others let them remain until they are about to be dropped from the list. If the dilatory members would pay on presentation of the bills they would benefit the Association as well as themselves. The Secretary and Treasurer have several times requested the members to notify them of a change of location. We would renew the request, I have thought. An unusual number of letters have been returned from the Post-office Department.

In sending drafts or postal orders the members will please write the Treasurer's name correctly. My name has been spelled in a variety of ways. The Post-office authorities refuse to pay postal orders unless the name is correct. I have held a postal order several weeks before it was corrected.

The correspondence of the Treasurer has so greatly increased that he has every spare moment occupied by it. He would gladly answer every letter by return of mail if he could do so. He will answer every one at the earliest possible moment. The members will please excuse any seeming delay. He will try and answer each in its turn.

I take pleasure in saying that in all my correspondence with the members during the past year not a single unpleasant expression has been used, and I sincerely thank the members for their many expressions of good will.

My dear brother Maisch and myself again meet for the seventeenth time as officers of the Association. In all these long years of service not a cloud "as large as a man's hand" has passed between us. We have both lost near and dear friends, but a kind Providence has spared us to each other and the Association, and we have been present at every session of every meeting. There will be a time of parting. Our prayer is that it may be long deferred.

With my sincere thanks to my brother officers and the authorized agents, I respectfully submit this report.

CHARLES A. TUFTS,
Treasurer.

Statement of the Receipts and Disbursements of the American Pharmaceutical Association for the year ending August 29th, 1882.

1882.	RECEIPTS.	
Aug. 29.	To balance on hand as per last report,	$1627 06
	To the amount received for yearly contributions previous to 1882,	2725 00
	To the amount received for yearly contributions for 1882,	1170 00
	To the amount received for membership,	610 00
	To the amount received from the sale of Proceedings,	39 35
	To the amount received from the sale of certificates,	417 50
		$6588 91

1882.	DISBURSEMENTS.		
Aug. 29.	By cash paid for the expense of the Proceedings:		
	Sherman & Co., for printing,	$1552 08	
	William Rutter & Co., binding,	312 80	
	Arthur J. Barnes, phonographic reporter,	100 00	
	F. Gutekunst, photographs,	82 00	
	Louis Dreka. engraving,	17 50	
	C. Lewis Diehl, salary as reporter on the Progress of Pharmacy,	500 00	$2564 38
	By cash paid for certificates:		
	American Bank Note Company,		47 00
	By cash paid for expenses:		
	John M. Maisch, salary,	600 00	
	Cash paid for miscellaneous expenses, including expenses attending the meeting at Kansas City, printing, stationery, freight, expressage, packing-boxes, and postage,	353 43	
	Charles A. Tufts, salary,	500 00	
	Cash paid for miscellaneous expenses, including expenses attending the meeting at Kansas City, printing, stationery, expressage, postage, filling out certificates, and the expenses of collectors in cities,	264 80	

George W. Kennedy, expenses as secretary of the Council for printing and postage,	$183 20	
William T. Ford, expenses of the meeting at Kansas City,	80 00	
Insurance of the property of the American Pharmaceutical Association, stored in the Philadelphia College of Pharmacy, in the German Fire Insurance Company,	15 00	1996 43
		4607 81
Balance to new account,		1981 10
		$6588 91

The committee appointed to audit the Treasurer's accounts respectfully report that they have carefully examined the Treasurer's books, compared payments with vouchers and find them correct in every particular, the books showing a balance in favor of the Association of nineteen hundred and eighty-one dollars and ten cents ($1981.10).

Samuel A. D. Sheppard,
Joseph L. Lemberger,
John Ingalls.

Niagara Falls, N. Y., September 13th, 1882.

REPORT OF COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association: In accordance with requirements of the Association, the Committee on Membership present for your consideration their report. A revised roll of members was published with last Proceedings, which can be found on pages from 573 to 604, both inclusive.

REPORT OF MEMBERSHIP.

Members in good standing at last report,		1225
Members elected at last meeting,	142	
Members who became members as delegates by complying with the by-laws,	5	147
Making a total membership of,		1372

LOSS IN MEMBERSHIP.

By resignation,	15	
Dropped from the roll for various causes,	52	
By death,	19	
Total loss,		86
Leaving a balance at this report of,		1286

There are no changes to report in the list of honorary members; we have twenty, representing ten different countries.

A large number of applications have been received, have been carefully examined, and found to be properly filled out and vouched for. In compliance with instructions from Council, there were ten thousand blank applications, and the same number of the following circulars sent out to as many druggists, in different parts of the United States and Canada.

AMERICAN PHARMACEUTICAL ASSOCIATION.

DEAR SIR: The American Pharmaceutical Association will hold its thirtieth annual meeting at Niagara Falls, N. Y., on the second Tuesday of September, 1882. It was organized in 1852 at Philadelphia, with a membership of 18, and has since convened annually in various cities from Toronto, Canada, to Atlanta, Georgia, and from Boston, Mass., to Kansas City, Mo. Its membership is at present about 1400, and the meetings are attended by from 100 to 200 members, many accompanied by ladies. Aside from the pleasant social reunions which have thus been inaugurated and cultivated for a number of years, the interest of these meetings is enhanced by the valuable reports and essays on subjects of scientific and practical importance to the pharmaceutical profession, which are annually presented, by the free discussion on these and kindred subjects, and by the exhibition of drugs, chemicals, pharmaceutical preparations, apparatus and appliances.

Thirty years ago there were only six pharmaceutical societies—all except one colleges of pharmacy—in existence in the United States; at the present time there are but few States without one or more such organizations. It is, therefore, evident that the usefulness and importance of uniting the pharmacists and druggists in the cultivation of the interests of their profession and trade are recognized everywhere, and it may be confidently expected that the claims of this Association, embracing already a large number of pharmacists of North America, for the co-operation of *all* may not be undervalued.

The Council of this Association has been charged with the duty of laying these claims before the reputable pharmacists and druggists; and in doing this we desire to direct your attention to the inclosed constitution and abstract of the by-laws, which will fully explain the objects of the Association and the conditions of membership; and to ask your co-operation, by signing the inclosed blank form of application, and by inducing others who are eligible, to give to the Association their good will and support. The annual contribution is only $5, and every member not in arrears is entitled to a copy of the annual "Proceedings," which form a handsome volume, the retail price of which is usually between $6 and $7.50; a prominent feature of this volume is the "Report on the Progress of Pharmacy," giving a summary of the pharmaceutical literature of all countries during the past year, the intrinsic value of which far exceeds the annual dues.

Further information that may be desired, can be obtained by addressing the Permanent Secretary of the Association, John M. Maisch, 143 North Tenth Street, Philadelphia, Pa., or one of the "Authorized Agents," whose addresses are annexed. Applications for membership, duly signed and indorsed, and accompanied by the fees (initiation, $5; one year's dues, $5; if a certificate of membership is desired, on paper, $5; or on parchment, $7.50), should, if possible, reach the Chairman of the Committee on Membership, George W. Kennedy, Pottsville, Pa., on or before September 1st.

All pharmacists and druggists are cordially invited to be present at the meeting; particulars as to travelling and other arrangements may be obtained from the Permanent Secretary in August, and from the various pharmaceutical journals of North America, for August and September.

(Signed) JOSEPH P. REMINGTON,
Philadelphia, Pa.,
Chairman of Council.
GEORGE W. KENNEDY,
Pottsville, Pa.,
Secretary of Council.

(Then follows list of authorized agents of the American Pharmaceutical Association.)

At this date seven members have resigned, ninety-three others are liable to be dropped for non-payment of dues, and twenty, who have ceased to be connected with the Association, have failed to return their certificates of membership. Since our last meeting, and up to the present time, the decease of the following ten members has been reported to the committee: George P. Kettell, Charlestown, Mass.; J. Thornton Weaver, Philadelphia, Pa.; Thomas P. James, Cambridge, Mass.; Charles H. Dalrymple, Morristown, N. J.; George B. Plummer, Hinsdale, Mass.; Henry D. Fowle, Boston, Mass.; F. X. Crawley, St. Louis, Mo.; John Faber, New York; J. O'Gallagher, St. Louis, Mo.; James E. Young, Vergennes, Vt.; Henry T. Kiersted, New York.

MR. GEORGE P. KETTELL, of Charlestown, Mass., died there of heart disease, Nov, 11th, 1881; he had been in bad health for about a year prior to his death, and was sixty-one (61) years of age. The deceased was born in Boston, and while quite young removed to Charlestown, where he was educated in the public schools. He served a regular apprenticeship to the drug business, and not long afterwards entered the drug store of Dr. Stevens, of Charlestown. About forty years ago, at the age of twenty-one years, he started in business for himself with very little means. He was a prominent man in the city where he resided, having held several positions of honor with credit, first as councilman, and subsequently in the school board, and as a member of the Board of Trustees of the Charlestown Public Library. He was well known in Massachusetts as a pharmacist, his reputation as such being good and his standing high. He was a member of the Massachusetts College of Pharmacy, which passed resolutions of regret at losing so valuable a member. He leaves a wife, son, and daughter to mourn their loss. Deceased became a member of the Association at the meeting held in the city of New York in 1867.

J. THORNTON WEAVER, of Philadelphia, died there of pneumonia, at the age of forty-six (46) years. He was born in Philadelphia, October 18th, 1835. At the age of seventeen, after receiving an ordinary school education, he commenced an apprenticeship to the apothecary business, entering the store of Henry A. Bower, northeast corner of Sixth and Green streets, and remained with him about eight years. About the year 1860 he started in business for himself on Ridge Avenue above Wallace Street, where he conducted business up to the time of his death. The deceased is spoken of as being an honest, upright, conscientious man and pharmacist, and was beloved by all who knew him. He left a widow and three children, and many sorrowing friends. He united himself with our Association at the meeting held in his native city in 1868.

THOMAS P. JAMES, of Cambridge, Mass., died at his residence, of paralysis, on February 22d, 1882, in the seventy-ninth year of his age. He was born at Radnor, near Philadelphia, September 1st, 1803. At the time of his death he was engaged upon his life-work, an illustrated edition of the mosses of America, a book designed to contain the descriptions, as well as illustrations, of all the different varieties of mosses of this continent, from Central America to Alaska. During the morning of the day of his death, he was working with his microscope and pencil, making drawings from natural plants, as had been his daily custom for years; he was seized with paralysis of the left side, which was quickly followed by loss of speech, and then coma, in which he passed away without a struggle. During his whole life he was a devoted botanist, and for many years has been interested in that portion relating to mosses. He had, it is said, the finest collection in the country, and was constantly in exchange with other bryologists all over the world. His specially arranged collection of mosses is contained in three large volumes, entitled "North American Mosses," by Thomas P. James, only one copy of which is in existence under that title. It is made up of pressed mosses from his herbarium, mounted on white paper, and all properly classified and named in Latin text, with spaces for new mosses as discovered. These valuable volumes probably form the most complete collection in existence. They were exhibited at the Centennial Exhibition in 1876, and botanists who had the opportunity of examining them expressed their pleasure at the completeness, accuracy, and neatness of the work. Dr. James was the botanist of the Horticultural Society of Philadelphia during his residence there. He was an active member, and at one time an officer, in the Philosophical Society of Philadelphia, the Philadelphia College of Pharmacy, and the Philadelphia Drug Exchange; of the latter body he was the second president. He was an active member in the Pomological Society, and for twenty-seven years treasurer of that organization, and, for his faithful services, received from it a special honorary medal. He belonged to the American Academy of Arts and Sciences, the Boston Natural History Society, and to the Torrey Botanical Club of New York. The American Association for the Advancement of Science, of which he was an active member for years, honored him with the title of "Fellow" in that society. He was widely known in Philadelphia at one time. Thirty (30) years ago he had a wholesale drug store corner of Market and Decatur streets, and afterwards removed to Market below Seventh, in order to have more room for his largely increased business. He leaves a widow, two sons, and two daughters. Deceased was an old member of this Association, having connected himself with it at the meeting held in the city of Philadelphia in the year 1857.

Charles H. Dalrymple, of Morristown, N. J., died at his home after a brief illness of pneumonia, lasting about a week. Mr. Dalrymple was born in the township of Randolph, near Dover, New Jersey, March 24th, 1830, and was, therefore, in his fifty-second year. At the age of sixteen he came to Morristown, entered the store of the late J. M. King as a clerk, and remained with him six years, when he went to Canton, Mississippi, remaining there for a year. In 1853 he clerked for the late John P. Voorhees, and in 1854 became a partner, under the firm-title of Voorhees & Co., and so remained until 1858, when he entered into business for himself, on the corner now occupied by the First National Bank, removing subsequently across the way to the store he occupied until his death. In all his business relations he was candid, honest, and particularly careful. He was a member of the New Jersey Pharmaceutical Association, one of its founders and organizers, and was elected its first president in 1870, serving two terms. The deceased served as a member of the Morristown Council for two years, was a director of the First National Bank of Morristown, and also a member of the Washington Headquarters Association. A curious fact is, that the date of his death, was the thirty-sixth anniversary of his leaving home and engaging in the drug business. Mr. Dalrymple leaves a wife and five children, three sons and two daughters, to mourn the loss of a kind and indulgent husband and father. He became a member of our Association in 1860, at the meeting held in New York.

George B. Plummer, of Hinsdale, Mass., died there January 13th, 1882, of apoplexy, in the forty-seventh year of his age. Deceased was born at Alton, Province of Quebec, July 10th, 1835, whither his parents had removed from New Hampshire. In 1865 he commenced to study the drug business with J. T. Webber & Co., of Springfield, Mass., and remained with this firm till 1870, when he formed a copartnership with John W. Curtice, and on the 1st of December, 1870, the new firm began business at Hinsdale, Mass., and thus continued until Mr. Plummer's death. He was a constant student, devoting himself closely to the interests of his profession, even to the injury of his health, which had been poor for some years previous to his death. He was a man of strict integrity, good judgment, close observation, and marked decision of character, which qualities, combined with a fine sense of honor, won for him the esteem and respect of a wide circle of friends. The deceased became a member of our Association at the meeting held in Boston, Mass., in 1875.

Henry D. Fowle, of Boston, Mass., died there quite suddenly of heart disease. Mr Fowle was born in Charlestown, Mass., May 3d, 1817, and was in his sixty-fifth year. He learned the drug business with his brother, the late Seth W. Fowle, whom he succeeded at the stand, corner of Prince and Salem streets, which he occupied more than forty years. He had been ill several months, and at the time of his death had but shortly returned from Montreal, in which city is established a branch of his business. He was well known throughout the country for his connection with the Numismatic Society, and was the possessor of a valuable collection of coins, for which he was offered $12,000. Deceased was never married. He became a member of our Association in 1853, at the annual meeting first held in Boston.

Francis X. Crawley, of St. Louis, Mo., died in Wheeling, W. Va., July 6th, 1882. Deceased was born in the latter city, November, 1832, and was, therefore, in the fiftieth year of his age. His initiation into the drug business was his reading materia medica in the dispensary of Dr. James Tanner, about the year 1850, he being at the time undetermined whether he would study medicine for the purpose of ultimately becoming a physician or a druggist. He afterwards accepted a clerkship in the drug store of T. H. Logan & Co., corner of Main and Tenth streets, where he remained until his departure for New York in 1854, accepting a clerkship in the store of Shedden & Neergaard, where he remained until 1863, when he removed to St. Louis, opening a store at 2301 Carr Street, at which place he carried on the retail drug business. He took a deep interest in everything pertaining to his business, was, in a remarkable degree, thorough and painstaking, careful to a fault, and in all that he undertook conscientious. Possessed of these qualities, prominent in business, he was always successful in gaining the confidence and securing the esteem of all having dealings with him. As a man, he had shining qualities, which endeared him to all. He was a devoted husband, a kind and indulgent father, and a true and warm friend. He became a member of our Association at the meeting held in Chicago in 1869.

John Faber, of New York, died at his residence after an illness of a year. Mr. Faber was born in Crailsheim, Württemberg, Germany, February 10th, 1824, and at the time of his death was fifty-eight years old. He studied pharmacy and chemistry in Switzerland, France, and Germany. Owing to the German revolution of 1848, in which he had taken part, he was obliged to come to America; he came to New York and started business there. In 1855 he became a member of the New York College of Pharmacy. In 1867 he attended the Pharmaceutical Congress at Paris, as the delegate of the American Pharmaceutical Association, and, in 1868, he represented our Association at the Congress in Vienna. He was eminently respected by all who knew him. He became a member of this Association at the meeting held in New York in 1855.

John E. Young, of Vergennes, Vt., died very suddenly in his store, Tuesday morning, August 11th, 1882. Mr. Young was born August 27th, 1845. He served a faithful term of instruction under the late Dr. F. Huntington, whom he succeeded in the drug business, which he has carried on for thirteen years with such scrupulous care and exactness, as to win the confidence of the medical profession and the public generally As in his business, so in his general habits, he was a model of propriety, above reproach, and respected and esteemed by all. Deceased became a member of our Association at Boston in 1875.

James O'Gallagher died in the city of St. Louis, on the 22d of June, 1882, at the age of fifty-four years. He was born in Londonderry, Ireland. When only ten years of age he had the misfortune to lose both of his parents; his education then devolved on his uncle, Dr. Crerand, of Paris, France. In that city he received his collegiate education, and also served his apprenticeship to pharmacy. In 1850 he came to St. Louis, and, with the exception of a few months spent in the East, resided here until his death, during all of which time he was devoted to the drug business. He was decidedly interested in the advancement of pharmacy, and took an active part in the organization of the old St. Louis Pharmaceutical Society, and more recently the St. Louis College of Pharmacy, occupying the chair of practical pharmacy in this institution during its first session. He was elected a member of this Association at the meeting held in Washington, D. C., September, 1858, representing the St. Louis Pharmaceutical Association, and was elected Second Vice-President at that meeting.

Henry Taylor Kiersted, of New York, died there September 13th, 1882. Mr. Kiersted was born March 13th, 1793, and at the time of his death was in his ninetieth year. In 1814 he entered the drug store of Mr. Fisher, corner of Prince Street and Broadway; subsequently he entered into business at the corner of Murray Street and Broadway, and afterwards at Spring Street and Broadway, and from there he made a change to the Prescott House, and in 1860 he moved to Broadway and Forty-sixth Street. He was one of the founders of the New York College of Pharmacy, and for several years its President, and in the years 1860 to 1862 was President of our Association. He took an active interest in the advancement of pharmacy, and labored indefatigably to elevate its standard. Deceased was one of the oldest members of this Association, having joined it in 1856.

Before closing my report I desire to return my heartfelt thanks to all officers and members who rendered me such valuable assistance when called upon.

George A. Kennedy,
Chairman.

The Report on the Progress of Pharmacy was read by title, and referred for publication. A like course was ordered with the Report of the Committee on the Drug Market (see page 461), which had been received after the close of the first session.

Amendments to the by-laws were proposed as follows:

Mr. Sheppard, Boston, Mass.—Mr. President, it must have been very apparent to the members yesterday, that a large amount of valuable time was almost as good as wasted in waiting for the report of the Committee on Credentials. Now that work is certainly routine work, and since the Association has appointed a Council for the special purpose of relieving itself of the routine work, it would seem desirable that this particular item of examining the credentials should be done by the Council. In order to bring such a desirable matter up I would offer, sir, the following amendments to our by-laws, that Chapter VI., Article VI., be so amended as to read, "The Council shall be charged with the examination of the credentials of delegates, and with the transaction of unfinished business," etc., according to the present reading.

That Chapter VIII., Article VI., of the by-laws be amended by adding to it, "All credentials shall be sent to the Permanent Secretary at least two weeks in advance of the Annual Meeting."

That Article II., Chapter IX., Section 4, be amended so as to read, "The President's address may then be read, after which the Council shall report the list of properly accredited delegates; the Secretary shall then call the roll, noting the names of the delegates and members in attendance."

Mr. Remington, Philadelphia, Pa.—Mr. President, I desire to say with regard to the matter which Mr. Sheppard has brought forward, that the subject has been very carefully considered by the Council, and it was deemed best to bring it up before the Association. There may be some members present who may think that it would require some explanation as just how it is to be done, and the Council did not wish to take upon itself the duty of taking this away from the Association unless the Association approved of it, and it is with the view of having the Association approve or disapprove of it that the subject is brought up.

Mr. Shinn, Philadelphia, Pa.—Mr. President, inasmuch as it would give us much more time for discussion, and as the motion has been seconded, I think, in accordance with the by-laws, that the subject should be left over to be voted upon at a subsequent session, when it can be passed upon intelligently.

The President.—It is so ordered; it will lie over.

A proposition was made and adopted that the Committee on the Time and Place of the next Annual Meeting consist of five members, and the President appointed the Committee as follows: Joseph Roberts, of Baltimore, Chairman; Charles Bullock, of Philadelphia, George J. Seabury, of New York, George W. Sloan, of Indianapolis, and P. C. Candidus, of Mobile.

An invitation to meet next year at Mobile, Ala., was referred to the committee just appointed.

Mr. Joseph Lemberger read a paper on "Thymol contained in Oil of Thyme" (see page 571), in answer to Query 2, and exhibited specimens of the oils and of the results obtained.

Mr. Sloan, Indianapolis, Ind.—Mr. President, while the subject of thymol is before us I wish to tell a fact which, so far as my observation has gone, has opened a new field of use for it. I refer to the fact that a small percentage of thymol covers the odor of iodoform perfectly in a lozenge. This I do not give as a discovery of my own; it was told me by a friend three weeks ago. I tried it and I found that there was no odor of iodoform left at all. You get the odor of thymol, of course. I have a sample of ointment prepared a few weeks ago in my room which I will bring in this afternoon and show it; I think the odor is vastly, at least to my sense of odor, more agreeable than the oil of peppermint.

Mr. Matsch, Philadelphia, Pa.—Mr. President, I would like to say a few words on the subject of Mr. Lemberger's paper. I am not able to report any experiments of my own on this subject, but I remember having read of some investigations, according to which thymol could not be entirely extracted from oil of thyme by means of hydrated alkalies, in case the thymol was present in a comparatively small quantity. That is to say, a portion remains dissolved in the thymene, of which oil of thyme consists to a considerable extent. It was therefore suggested that oil of thyme should, in order to obtain all the thymol present therein, first be submitted to fractional distillation, and that the portion remaining in the still, which is a more concentrated solution of thymol, can then be far better used for extracting that compound. The members of the American Pharmaceutical Association should remember that thymol can be obtained usually in considerable quantity from a strictly American product, namely, from the oil of horsemint, Monarda punctata. The oil of Monarda punctata, when exposed to a low temperature, separates a considerable amount of crystals of thymol. They require to be freed from the hydrocarbon by crystallization from alcohol, in order to deprive them entirely of the odor of monarda, and make them identical with thymol obtained from oil of thyme.

Mr. Lloyd, Cincinnati, O.—Mr. President, two or three years ago I endeavored to make thymol from the commercial oil of thyme, and I could not get enough thymol out of the sample I used to pay me for the experiment; it was almost destitute of thymol. I gave up in disgust. That sample was brought from the old country.

Mr. Remington, Philadelphia, Pa.—It seems to me, Mr. President, it would be very interesting to get a collection of samples of oil of thyme, if possible, that are fifteen or twenty years old. The introduction of the use of thymol as an antiseptic is of comparative recent origin, as we all know. To my mind it is very plain what the cause of the trouble is with the oil of thyme as imported; the manufacturers having a better and a more profitable market for thymol they make the thymol, and sell it and send the residue as oil of thyme; and that is the explanation why at the present time it contains very little thymol.

The President.—What quantity would be required for an experiment of the oil?

Mr. Remington.—It would be possible to ascertain the amount from even a fluid ounce of the oil.

The President.—I have two or three ounces of the white oil of thyme, which was distilled from Lancaster County thyme in 1842 or 1843, and I will cheerfully present it to any person who wishes to try the experiment.

Mr. Lloyd.—Perhaps Professor Remington would accept a query on that subject, and would accept the sample.

Mr. Remington.—I think that is taking an unfair advantage of the discussion.

The President.—I make the offer to any one present

Mr. Remington.—I would suggest that as our friend Heinitsh has the oil of thyme he might accept the query.

Mr. Lloyd.—I think our friend will have his hands full for the next year. It is better also, as suggested by the Professor, to select samples from other sources, to see if the old oil of thyme does contain more thymol. This can be done very well.

Mr. Bedford, New York city.—Mr. President, even if the pure article is sold, it is sold at a price which can scarcely remunerate the manufacturer, and we may judge that there is little or no commercial oil of thyme that is pure. I do not believe that it is possible to find any oil of thyme, excepting a brand which is known as the white oil of thyme, that is anything like pure in quality. The difference in price between the two varieties is represented by the ratio of one to four. That is, the white oil of thyme is worth in quantity nearly $2.00, while the so-called oil of red thyme can be had at any time and in any quantity at an importing price of somewhere about fifty cents. Now it is evident that no oil of that kind can be pure oil. In fact the importers, while they sell it for pure, admit that it is not pure, and I believe that amongst the different importers who sell the same grade they are willing to concede a price to very close buyers, and they also concede a little more to turpentine.

Mr. Gregory, Lindsay, Ontario, C. W.—How much thymol was found by Mr. Lemberger in the genuine American oil of thyme?

Mr. Lemberger.—A very small percentage, but the oil was distilled from the dry herb. That is one way of accounting for it. That's not the way to make the oil of thyme.

Mr. Maisch.—That is the way to obtain thymol. You obtain more thymol from the dry than from the fresh.

Mr. Gregory.—In Ontario, where the herb is very plentiful, we distil a dark oil from it.

Mr. Lemberger.—I must say that I disagree with what Professor Maisch says. I believe the dark oil of thyme is richer in thymol than the white, and of course it would be cheaper. It is not re-distilled. I learn from those with whom I came in contact talking about the oil of thyme, that it is largely imported, and then re-distilled again as white oil of thyme. It may be a mistake, my informant could have been wrong, but in this way he explained the difference. I came to the conclusion that the dark oil was distilled right on the spot, in all likelihood, and that it was, if it had not been manufactured, as many of the cheap oils are, easily colored. Just in this connection I wish to say also that there seems to be a want of information among the wholesale trade as to what the retail apothecary wants when he asks for oil of thyme, whether he does not want the oil of Erigeron. It may be that some know no difference, and so they sell both out of the same bottle or the same canteen, but the impression on my mind was that the dark oil of thyme was the one that had the largest percentage of thymol.

Mr. Gregory.—The sample oil of thyme of which I spoke I am sure was genuine and had not been meddled with, and out of that I could only get something less than 1 per cent. If this is the case generally I think you will have to look somewhere else for manufacturers, or else expect less thymol in their samples. I think I understood you to say that from the dark oil of thyme you got over 38 per cent., while from the American pure oil you got something less than 1 per cent.

Mr. Lemberger.—I said that the crystals last named, No. 9, were decidedly better in size and appearance from any. I obtained 38.75 per cent. That is the computation sent me since I got here. It was not dry enough to bring along.

Mr. Shinn.—Perhaps some of the members of the Association would like to know whether thymol is made in full quantity at the first distillation, or whether it is the result of oxidation by long standing? Is it a substance which increases by the age of the oil, or is the whole amount obtainable present in the fresh oil? Mr. Heinitsh has a specimen forty years old that will be very rich in thymol if it is the result of oxidation. I am not posted on the chemistry of the thing, but I would like to know.

THE PRESIDENT.—I have a specimen from the dry herb, grown in Lancaster County, made in 1842 1843. It is white, but I do not know how rich it is in thymol.

MR. SHINN.—It was the chemical character of the thymol I was talking about.

MR. MAISCH.—The oil of thyme consists of hydrocarbons on the one hand and of thymol, which is an alcohol. The hydrocarbons are cymene and thymene, the latter a terpene, and by long exposure to the atmosphere nor, to the best of my knowledge, by other means, have these hydrocarbons been transformed into the alcohol,* consequently the thymol pre-exists in the herb and in the crude oil. The hydrocarbons being more volatile than the alcohol thymol they volatilize first, and that is the reason why I suggested before that the oil of the dry herb should yield a larger percentage of thymol than the oil distilled from the fresh herb. Another cause, however, must be given for the variation in the amount of thymol, and it should, in such investigations, certainly not be left out of sight, and that is that plants grown in different localities frequently contain the same constituents in different quantities. Thus, for instance, sometimes oil of peppermint contains a large amount of menthol, while at other times it contains very little. The same will hold good undoubtedly for oil of thyme. The question, I believe has never been fully determined, unless a solution of it can be found in the old work of Zeller, containing his investigations on volatile oils, which were made some thirty years or more ago, as to whether the oil of thyme distilled from herbs grown in a southern locality congeals at a higher or lower temperature than the oil obtained from herbs grown in northern localities. That would be the point to be determined no doubt.

MR. THOMPSON.—These ideas and suggestions are very interesting in a scientific point of view, but I should like to bring out the information as to what is the practical value, pharmaceutical value, of thymol as compared with other well-known and much more available antiseptics.

MR. SHEPPARD.—Before that discussion is entered into I should like to ask Professor Maisch if I understood him correctly as saying that he should sum up his remarks in these words, that fresh oil of thyme contains as much thymol as the same oil would yield were it forty years old? Do I understand you correctly?

MR. MAISCH.—I mean to say that I believe that thymol does not increase in quantity or amount by age. The older oil might be thicker, might be much denser than the fresh oil, but that would then be due to resinification of the hydrocarbons rather than to an increase of thymol.

MR. LLOYD.—Would it not be possible to evaporate the hydrocarbon and leave the thymol?

MR. MAISCH.—Certainly.

MR. ROSENWASSER.—In answer to the gentleman who spoke a few moments ago as to the antiseptic action, by exposing a solution of thymol or a solution of the oil of thyme supposed to contain thymol to the action of the air, it should be remembered that oil of thyme has a very agreeable odor and is deceptive as to the amount of thymol, and it would be a question as to whether the value of such a disinfectant would depend solely upon the thymol or upon the amount of ozone produced by the volatilization of the volatile oil. On that account the question as to how much thymol is contained in the oil of thyme and its value as a disinfectant is a subject which would be valuable for pharmaceutists as well as for the health of the country.

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* Gmelin reports an observation made by Lallemand in 1853, according to which in five months 1500 liters of dry air were passed through a mixture of cymene and thymene, when the latter had become thick and darkened, and to potassa yielded considerable thymol.—SECRETARY.

Mr. Remington.—I merely wish to say a few words with regard to the subject touched upon by Mr. Shinn. It was believed for a long time that thymol was a stearopten of the oil of thyme. The stearoptens have been regarded as natural productions. I recall the paper of Professor Procter, written as long ago as 1846, in which he made some monardin corresponding to the thymol. He passed oxygen through the oil of horsemint, if my recollection serves me right, and he did not get any of the crystals of the stearopten or monardin which he expected to get. It is undoubtedly true that by gradually exposing oil of thyme to the action of the atmosphere with the expectation that the oxygen is going to convert it into thymol is a mistake. It cannot be produced in that way.

Mr. Rosenwasser.—Might not water, if passed through that mixture, have the effect that oxygen does not have? And if oil of thyme was distilled in a dry or a wet atmosphere, under such different conditions, would you not obtain a different result, that could be relied upon as a reason why it is antiseptic?

Mr. Gregory.—It appears to me, judging from what I have seen in my early days, that very probably the moister climate of England, and some of the countries on the Continent of Europe, may be the cause why thymol may be more common in some varieties of the oil of thyme than others. I have a lively recollection of thyme in my childhood days in England, and I believe that the herb smelt very much more strongly of thyme than that found in Canada. The climate here is dryer; there it is moister. I used to hear about the sweetness of the Grecian honey, and that the bees drew its flavor from the banks of thyme that grew on the mountains of Greece. Recollecting this, it may have been that the moister climates in those countries may have had the effect of producing more thymol than in the herb.

Mr. Prescott.—It must not be forgotten in an inquiry as to the antiseptic power of thymol that it is pretty clearly established to be a phenol, a class closely corresponding, as Professor Maisch has said, to the alcohols, and a member of that class or series of which phenol proper, creosote, xylene, are three members. We have in the phenols, so far as we know anything about it, the higher carbon members, with higher and stronger antiseptic powers than the lower members. Cresol, known as cresolic acid, is a more intense antiseptic than crystals of carbolic acid. I think there is very good evidence that, perhaps in sufficient division, thymol is a very strong antiseptic,—an antiseptic of the class of phenols,—the action not depending upon oxidation or the formation of ozone; not producing or favoring oxidation, but an antiseptic, pure and proper, depending upon contact to arrest decomposition and to destroy ferments; and the hydrocarbons with which it is connected, in the oil of thyme, have probably nothing more of an antiseptic action than other terpene oils, producing ozone and resinification, probably, but very insignificant features in the antiseptic power of oil of thyme, containing thymol.

Mr. Maisch.—These remarks by Professor Prescott remind me of a subject which I think should be mentioned in this connection, and that is this: that one and the same antiseptic will not answer equally well for all antiseptic purposes. I remember that in a large number of experiments which have been made in the Physiological and Chemical Laboratory of Dorpat, under the supervision of Professor Dragendorff, it was proven that, while an antiseptic may be a comparatively powerful agent for a certain class of articles, it may have, comparatively, little value in other cases; therefore, whenever experiments are made with new antiseptic agents, they should be made upon a large number of different classes of preparations, so as so determine in which direction their antiseptic power lies.

Mr. Lloyd.—May I ask this question: Am I to understand that thymol can be obtained from horsemint by exposing it to a low temperature? Can it be obtained, also, from oil of thyme by exposing it to a low temperature?

Mr. Maisch.—I am under the impression, but I speak only from memory, that Zeller, in his valuable investigations on the volatile oils, which he distilled himself, states that oil of thyme, prepared under different circumstances, will yield crystals varying in amount when exposed to the same temperature,—a low temperature.

Mr. Candidus read a paper on the "Solubility of Chemicals in Alcohol," in answer to query 10? (See p. 564.)

Mr. Parsons.—As I understand it, the solubility of these salts differs according to the specific gravity and amount of alcohol at a low temperature and at the boiling-point; I wish to ask what precautions were taken to prevent loss of alcohol in boiling? I wish to ask how the solubility of these salts in boiling alcohol was determined; whether any method was employed to prevent the loss of alcohol in boiling.

Mr. Candidus.—By corking the test-tube lightly and heating it in a water-bath there was no loss of alcohol. Before the boiling-point is reached take out the cork and let the air escape a little, and then put the cork in tightly and keep it there, and there is no loss of alcohol.

Mr. Parsons.—It seems to me, Mr. President, that there must be some loss of alcohol. If some return apparatus be used—an inverted condenser—the alcohol would drop back, the salt would then be constantly in contact with a fifty per cent. alcohol, and on heating the mixture of equal parts of alcohol and water, there must be considerable danger that some of the alcohol will escape. The increased pressure is another point which has been suggested to me. If the salt is placed in an apparatus which is tightly corked, and then heated, the increased pressure will greatly affect the solubility of that salt. It is a well-known fact that when treated in such a manner certain salts are rendered much more soluble when subjected to an increased pressure. It seems to me that the same method which would return the alcohol without any great back pressure would be the proper way to determine the solubility at the boiling temperature.

Mr. Lloyd.—Let me ask Mr. Parsons, if we should place dilute alcohol, or alcohol thus made, into a test-tube or retort, and apply heat until it boils, would that alcohol within the retort be dilute alcohol after boiling?

Mr. Parsons.—I don't think it would be dilute alcohol, unless there was some method for keeping it dropping back about as fast as it would vaporize.

Mr. Lloyd.—Would the alcohol distilled be stronger than that which remains and thus decrease the strength of the alcohol in the retort?

Mr. Parsons.—This was the point I was trying to determine clearly; that if the cork was left out the alcohol would be vaporized and the solubility of the salt, in a 50 per cent. alcohol, would not be correctly indicated; whereas, if some return apparatus were used, it would be possible to get more closely at accurate results; and yet it is a difficult matter, it seems to me, to determine.

Mr. Lloyd.—I would like to ask Mr. Candidus a question: In adding these salts to the alcohol in the tube, does he add a small amount of these salts, or a large portion at a time, and then leave the residue?

Mr. Candidus.—I added a small amount, gradually, first experimenting at 15.5°; but when experimenting at the boiling-point, I had a pretty good guide by the first results. I found the salt would dissolve by adding it in small portions, and there would be very little loss of alcohol—none, in fact. Take an amount of liquid that would fill about one-fourth of the test-tube; the pressure would not be sufficient to break the test-tube, and you could keep the cork in all the time, except with a substance like iodine, which would break the test-tube.

Mr. Lloyd.—That is not exactly what I am wishing to get at. If you wish to decide the solubility of ammonio-ferric alum, for instance, do you put into the alcohol a large crystal and boil until it is entirely dissolved, and then add slowly more crystals, when they disappear, and so on, until there is no more solution?

Mr. Candidus.—Large crystals were generally powdered, and then gradually added until the liquid would dissolve no more, bringing it back to the same temperature again. With large crystals it would take too much time.

Mr. Lloyd.—One more point: In determining the solubility, what length of time is the salt exposed to the boiling solution? As a rule, how long do you expose the salt to the boiling solution?

Mr. Candidus.—On an average, it was about from five to ten minutes.

Mr. Rosenwasser.—I have another question to ask: At what elevation above the sea-level were these experiments conducted? That is a question which largely determines the boiling-point. It is well known that a difference in elevation would affect the result—so much so that I am inclined to think that the experiments made as to the difference in solubilities will be found to be valuable largely in proportion to the determination of that one element.

Mr. Diehl.—I have no experience myself in determining solubilities. From the practical standpoint from which I view the matter, it seems to me that the small amount of pressure that might be obtained under the circumstances, while it would influence the solubility of the salt to some extent, is probably very small or very insignificant. On the other hand, if a return condenser were employed, as suggested by Professor Parsons, there would be continually a portion of the alcohol in the condenser, and the varying proportions would be maintained in that way to a much greater extent, it seems to me, than if diluted alcohol was properly secured in the vessel in which the liquids were mixed; the uniformity of the liquid would then not be altered.

Mr. Lloyd.—Mr. President, I made some experiments last winter on solubilities, and I found a great deal of trouble in determining them. In some instances I would have to go over and over the work before I would be content to accept the results. This point that Professor Diehl makes regarding the return alcohol was one that I have considered, and I overcame that trouble in this manner: I used a small retort connected very closely with a Liebig's condenser. I would place an amount of alcohol in the retort, and then, as the retort was connected with a condenser with rubber, while it was boiling remove the light, invert the retort, pour the alcohol out, return to its proper position again, leaving a sensible amount of vapor in the condenser; then place the alcohol immediately in the retort to determine my solubility. I found better results from that process than from any that I used.

The Secretary read the following report of the Committee on Prize Essays, which, on motion, was ordered to be published, and the suggestions contained therein were referred to the Council for action:

To the American Pharmaceutical Association:

Gentlemen: Your Committee on Prize Essays regret to report that, after a careful consideration of the papers read at the Twenty-ninth Annual Meeting of the Association, they again find that none of them are entitled to the award of the "Ebert Prize." Your committee regret this all the more because, during their service, extending over a period of several years, they have only once had opportunity to award the prize. They are unanimously of the opinion that some step should be taken whereby competition for this prize may be secured, and beg leave to offer the following suggestions with a view to this end:

Prominent attention should be drawn to the fact that this prize will be awarded. This is, perhaps, best done by circulars issued annually.

In addition to the conditions required by the original resolution, the following should be made:

Competitors for the prize should present their papers in duplicate; one should be signed by the author and handed, in a sealed envelope, to the Chairman of the Council for publication; the other should not be signed, and should be handed to the Chairman of the Committee on Papers and Queries, to be read at the Annual Meeting, and then handed to the Committee on Prize Essays.

Competitors should, moreover, understand that their researches must embody original facts or work.

If some such plan is adopted the Association may reasonably hope for a larger number of papers worthy of its aim, while the Committee on Prize Essays will be enabled to make a report within the time specified in the by-law governing their action.

All of which is respectfully submitted,

C. Lewis Diehl,
Chairman.
J. F. Judge,
Emil Scheffer.

Mr Kennedy read a paper on the "Strength of Commercial Mercurial Ointment," in answer to Query 25 (see page 551).

Mr. Remington.—Mr. Kennedy describes a specimen of mercurial ointment as being white on top. That condition of affairs very often takes place in the best mercurial ointment. It arises from the fact of its going through very hot weather, or being near a stove, or being in a warm room, when the ingredients will separate from the difference in their specific gravity. Take mercurial ointment, well made; put it near a stove, where the fat can melt; after some time, the mercury will be found at the bottom. Of course, when it cools, the tallow will congeal, and you have the white tallow on the top.

Mr. Kennedy.—I am well aware that that is the case with the best mercurial ointment. The case I referred to in the second specimen I examined was not in a warm place; it was during the winter, and it was found in a jar holding, I suppose, about a pound when full. There was about a half a pound of ointment in the jar when it was separated as I have described.

Mr. Remington.—That might have been the fact, and it might not have been used since the summertime, or since it had been heated.

Mr. Menninger, Brooklyn.—Mr. President, apropos of the question of mercurial ointment, I would say I recently came across a very singular adulteration of that article. A man connected with one of the large horse-car stables in Brooklyn purchased of me some mercurial ointment, but at the end of the month he demurred, and objected to the price I had charged him, telling me that for that same price he could buy from a druggist who had supplied him, double the amount. I showed him the price current of the wholesale manufacturer, and proved that I had charged but a small advance on that. He shook his head, and said he would bring me the bill of the other dealer. He brought me the bill. The bill was all right enough; the man did sell at one-third the price at which I had sold. I then asked him if he had a specimen of that mercurial ointment on hand. He said he had, and he brought it to me, and, on examination under the microscope, I was at first puzzled, as I could not make out what the darkness of the ointment was at all due to; I distinguished black spots throughout the ointment which were an enigma to me. I then carefully melted the ointment, decanted it, filtered it, and got these black spots separated from the mercury, and found them to be charcoal—charcoal mixed with a very small proportion of mercurial ointment; a very singular adulteration, but one by which competition can be carried on successfully. There was not more than from 6 to 8 per cent. of mercury in it. I did not measure it exactly.

Mr Mahlon N Kline, Philadelphia.—I would like to ask Mr. Kennedy, when he came to that druggist to procure those samples, whether he first purchased it as one-third mercury or one-half mercury? It seems that a majority sold to what are claimed as the retail trade is about one-third. It is a well-known fact that retailers specify, when they order, from one-third to one-half It seems to me that it would be important to have that known.

Mr. Kennedy.—I would state, Mr. President, that I did not make the inquiry from all the pharmacists from whom I obtained the mercurial ointment, but two or three of them told me that they had ordered strong mercurial ointment, and as to my own case, that which I sold only contained 40 per cent. It was sold in my store, and I know that that was purchased for strong mercurial ointment. I know, too, that one or two have told me that they buy it strong and weaken it. They are bound to do it in order to compete with the trade. They take lard or another fat, mix with the ointment that they receive, and that will account for the fact that one party would sell an ointment containing 33 per cent. of mercury and another party will sell an ointment containing 50 per cent. of mercury as mercurial ointment, and they don't try to conceal it.

Mr. Lloyd.—We have another paper on mercurial ointment which it might be well to hear.

Mr. Saunders.—I am surprised to hear of crookedness where we are supposed to do things straight. I have known lampblack to be added to bring the color up. Where dilution has been carried so far as to weaken the ointment, that dilution is not always done for the purpose of lowering the price. I suppose it is given almost everywhere—the blue ointment—as a domestic remedy. In the country many druggists are afraid to sell that ointment with all the mercury in it, for fear of producing salivation. In some cases it is diluted purposely when sold. It is sold for full strength to physicians, who understand fully the use of it.

Mr. Rosenwasser.—I have had some experience in mercurial ointment which contained a certain amount of mercury, yet, owing to the method in which it was made, it contained the impalpable mercurial powder, which can be made by shaking up mercury with turpentine, and such a sample was used by the physicians in a New York hospital; the only objection to its use was that, like lampblack, it left its mark on the patient, while it presented the mercury in a much finer state of division than the ordinary mercurial ointment. It was open to that one objection, but the facts that it contained a substance that was black should not cause every druggist to suspect that it was lampblack.

Mr. Markoe, Boston.—I question very much whether we can get an impalpable powder of mercury in any such way as the gentleman speaks of.

Mr. Rosenwasser.—If there is another paper on mercurial ointment, would it not be a good time to read it now, and then have the whole subject discussed?

Mr. Lloyd.—That's my opinion. I think it would be a good plan.

A volunteer paper, by Professor Emlen Painter, on the "Preparation of Unguentum Hydrargyri," was read and, on motion, accepted and referred (see page 550).

Mr. Remington.—I do not want to say too much on this subject, but with regard to that last paper that has been read, I think it is only fair to say, that I recommended a similar process at a pharmaceutical meeting of the Philadelphia College of Pharmacy, and it has been reduced down to small proportions, and will be officinal in the new Pharmacopœia. Mercury is used as an external remedy, and it is not necessary, as is popularly supposed by the trade, to use a rancid ointment. It is possible to have a mercurial ointment perfectly fresh and sweet, and there is no necessity whatever to use the old, rancid stuff.

The Secretary.—I am not quite content with the discussion on these papers on mercurial ointment. I should like to ask a question or two. In looking over the figures which Mr. Kennedy obtained in his essay, they strike me as being very suggestive or very curious. I would ask him the question whether he knows whether this ointment was dispensed as officinal?

Mr. Kennedy.—I say in my article that they were not in many cases. They are sold for what they are—sold as the ointment prescribed by the Pharmacopœia.

Mr. Maisch.—I am sorry that this paper has been written in this way. There is one officinal article, and it is of only one officinal strength. In looking over this paper it would seem as if every wholesale and retail druggist throughout the United States was practicing adulteration, and as if it was high time that each drug store had one or two drug inspectors. It almost seems, from the remark made, as if these ointments were picked out mainly to ascertain whether adulterated articles could be found.

Mr. Lloyd.—Mr. President, when a man steps into a drug store and asks for a dime's worth of blue ointment, would he be furnished anything but the officinal ointment?

Mr. Shinn.—The question was as to the strength of commercial mercurial ointment. It seems to me if he went and asked for blue ointment he got a commercial specimen.

Mr. Kennedy.—That's what I did. I not only asked for the ointment, but I tried to ascertain if it was diluted or in a bad condition. I went myself and examined the jars before I examined the ointment. I did not go around the counter and hunt for the worst specimens to be found. I simply took them as I found them, not only in

Schuylkill County, but in different portions of the State, and I don't see how I could have done better.

Mr. Kline.—I want to refer to the question again more as a wholesale druggist. Quite a very large proportion of our orders which are received for the mercurial ointment are for one-third strength. Now then it seems to me, to answer that question, to put the retail druggist in the proper light, it is necessary to know what proportion of this mercurial ointment was purchased for one-third, and what for one-half strength, and if that was not done it seems to me altogether likely that a large proportion was bought as of one-third strength, and that would certainly have a bearing.

Mr. Menninger.—I would like to ask whether the question as to the strength was put?

Mr. Kline.—I can answer for myself and not for others. We are guided by what we suppose the customer wants, or what he has been getting rather. If he had before specified one-half we fill the order in that way, if one-third then in that way; we give it to him in the way he has been getting it.

Mr. Menninger.—Where he does not specify what is given him then?

Mr. Kline.—We give him what we know he wants, if not we give him one-half.

Mr. Cowdrey.—That is the point. What is the strength of the ointment sold by the drug trade, when the ointment is called for on prescription, then what is given? Judging from reading the query I should say that was the intention of the query, and that is the question that I should like to have settled. I think that Mr. Kline in his remarks would lead us to believe, from his statement I certainly gained that idea, that druggists and pharmacists as a general thing, when mercurial ointment is called for, dispense the ointment at one-third strength, even when they have the ointment at its officinal strength, in preference to dispensing the other.

The President.—You must take into consideration that what is used in cities or upon the prescriptions of our physicians, is different from that which is used in the rural districts. If every man when ordering says that he does not want the 50 per cent. strength, but wants the weaker or the cheaper article, and as Mr. Kline says in his remarks on that query, the druggist sends out the ointment of one-third strength, and the ointment of that strength is used by the retail druggists, I think that would explain the reason why it is on the market.

Mr. Cowdrey.—As helping along that, I would say that ninety-nine pounds out of a hundred are of the full strength.

Mr. Roberts.—I think this very unfortunate, that mercurial ointment is not made of a specific quality or strength. In my own practice as a retailer I do not profess to investigate as to the exact strength, but I order 50 per cent. mercurial ointment, and dispense that as such under the name of mercurial ointment; and I know no other preparation but that one in my store. I think a mercurial ointment means a preparation that contains 50 per cent. of mercury, and that a pharmacist is not justified in dispensing under that name any other form of mercury.

Mr. Lloyd.—I would like to ask Mr. Kline if it is not the case whenever mercurial ointment of one-third strength is ordered, if it is not the custom when it reaches the pharmacist to dispense this as the ordinary mercurial ointment?

Mr. Kline.—I know, but then the paper states twelve specimens were obtained from retailers and three from wholesalers. Now it is apparent to me that some of them ordered 50 per cent. mercury and others ordered one-third mercury, and I think that must have been specified, or at least it was known that that was what was wanted. Nearly all the specimens obtained from the retailers were very much below that, and that leads me to think that it was bought for one-third mercury; and while there may be no justification for the retail trade in buying that strength, I know that they do buy it, and in a very large proportion.

Mr. Menninger.—There is one thing in this discussion that has been brought out, and that is that the wholesale trade is comparatively the most honest of the two branches of the profession. I have long had a suspicion of that kind; but there is another thing that in a spirit of justice ought to be said, and that is that we as retail druggists do not pay that attention to the examination of drugs, chemicals, and pharmaceuticals which we should. I for one plead guilty, and I know that many of my acquaintances are equally negligent with myself. Notwithstanding this utter confidence in the wholesale trade it would be well if we were more careful in the examination of our drugs, because it would tend in the first place to keeping those other men in the righteous way, and tend more permanently to security and the confidence in our own goods; and as I have seen some of the advance sheets of the forthcoming Pharmacopœia, I hope that that portion of our national standard which demands certain strengths of preparations and certain tests, will command the attention of the pharmacists more thoroughly hereafter than probably it has done in past years.

Mr. William B. Thompson.—In reference to the very pertinent query of Dr. Menninger, and the reply of my friend Mr. Kline, I propose for the wholesale trade a better criterion, and that is that we should follow that important clause in that familiar prayer, lead us not into temptation; and that he should judge his orders not by what he has been giving but what he ought to have. (Applause.)

Mr. Kline.—Now Mr. President, I would like to reply to that for one moment, and I would say that we, as wholesalers, are the servants of our customers, but I do not know that we are called upon to regulate their morals, and if we serve them with certainty with what they want, where it is legitimate, we do our duty. If I send out to John Jones, who has been getting one-third mercury, one half mercury, and charge him ten cents a pound more,—that is the relative price,—he would be very apt to charge it back to me when he settled his bill, so that I would be the loser, and I do not know that I am called upon to contribute that to his better morality.

Mr. Bedford.—In regard to what the retailer wants or gets, it is a matter of question by the wholesale druggist, in the light of what kind of a man he is. The wholesale druggist is the servant of the retailer, that is true so far as supplying his wants. The Pharmacopœia calls for a certain standard, as our friend says; suppose he wants the officinal article in the cities, while the rural districts want it one-third for their purposes, and therefore prefer it of the lower strength. To be sure the Pharmacopœia specifies an article of fifty per cent. strength, and that means to the retail druggist, while what he needs at a certain price cannot be furnished of the full strength. This thing happens not only with mercurial ointment, but with many other preparations. When a druggist orders his goods and does not specify the strength the wholesale druggist is justified in sending him what he thinks he wants. I do not defend him, mind you, I say he is justified simply on the ground of trade usages; he cannot make the morals for his retail customer. But I will say this from my experience, that fully nine-tenths of all that is sold for mercurial ointment, in my experience of thirteen years in the wholesale business, is one-third. If Mr. Roberts or Mr. Heinitsh were to order it, not specifying one-half, from my knowledge of them I would send them the officinal, and I wish that I could say that of many more, but it is only too true that those men who stand up pre-eminently for the quality of their goods, they get the fifty per cent., if they do not specify it. I know perfectly well what the Pharmacopœia says, but the trade usage, and the knowledge of that very thing that Mr. Kline alluded to, that the difference is charged back to you, prevents the druggist from using that morality that you expect of him. I think that the results of Mr. Kennedy's paper show what the market is, that it is usually one-third. I do not think that you will find it fifty per cent. in one store in ten.

Mr. Lloyd.—The difference is not as great as you might expect; you ought to bear in mind one fact though,—if I mistake not, our friend Mr. Kennedy had some as low as twenty per cent. in mercury.

Mr. Menninger.—I would like to have you indulge me with one word more. I cannot allow this to pass without saying something in the way of a protest against the assertion made here by certain wholesale dealers, that they are justified in never sending the officinal article. I charge it upon the wholesale trade that they are responsible for that fact, that preparations of different qualities are in the market at all. This matter of competition between wholesale houses that has led to this adulteration of officinal preparations is on a par with the practice of mixing rice flour and alum with cream of tartar, and selling it as druggists say they can sell it, for less money than the retail druggist. This thing has gradually wormed itself into the trade. It has been done as far as I remember; I will not say how long that is, because you might get at my age, but certainly I recollect the fact of mercurial ointment of different strengths being sold in the shops for over thirty years past. I did not know how far it had gone, but the assertion which has been made to-day gives us some light upon that point. There is no justification for the wholesale dealer or manufacturer any more than for the retail dealer to sell any article of less than the officinal strength.

Mr. Wells.—I fairly agree with what Mr. Menninger says; a wholesaler, when an order is sent, should sell what the United States Pharmacopœia specifies; on the other hand the retailer is justified at times in selling a dilute article. When in Cincinnati, I called in at a drug store and asked for twenty-five cents worth of blue ointment; I received it, and the druggist made the remark that a young man who was suffering from some disease felt himself justified in covering himself all over with blue ointment, which resulted in salivation to such an extent, that the man died in two years. Now I think in such a case a man is justified in selling a dilute article. It would be his place to buy the blue ointment of the Pharmacopœial strength, and then reduce it, and sell it for ordinary purposes. I do not think the retailer is justified when he puts blue ointment in a prescription, according to a physician's order, to put up anything but the Pharmacopœial strength. For ordinary retail purposes the dispensing of blue ointment might result seriously, as in this case, it having cost one man his life. He was a large-built man, well developed and healthy, and I am satisfied that the use of the blue ointment resulted in his death.

On motion of Mr. Bullock the Association paid a visit to the exhibition room and then adjourned until Thursday morning at 9 o'clock.

Third Session.—Thursday Morning, September 14th.

President Heinitsh called the meeting to order at 9 o'clock. The minutes of the second session were read by the Permanent Secretary and approved. Mr. Kennedy read the minutes of the session of the

Council, which were likewise approved; these minutes give the following information:

> The new Council organized by electing Joseph P. Remington, *Chairman;* W. J. M. Gordon, *Vice-Chairman;* and G. W. Kennedy, *Secretary.*
>
> *Committee on Membership:* George W. Kennedy, Pottsville, Pa., *Chairman;* Henry J. Menninger, Brooklyn, N. Y.; John Ingalls, Macon, Ga.; William S. Thompson, Washington, D. C.; William B. Blanding, Providence, R. I.; and the Treasurer and Permanent Secretary of the Association, *ex officio.*
>
> *Finance Committee:* S. A. D. Sheppard, Boston, *Chairman;* Joseph L. Lemberger, Lebanon, Pa.; Henry J. Menninger, Brooklyn, N. Y.
>
> *Publication Committee:* Joseph P. Remington, Philadelphia, *Chairman;* C. L. Diehl, Louisville; William Saunders, London, Ont.; W. J. M. Gordon, Cincinnati; and the Permanent Secretary of the Association.
>
> Communications signed by a number of the members of the Association, recommending eleven prominent pharmacists residing in foreign countries for honorary membership, were favorably considered, and ordered to be reported to the meeting.
>
> An amendment to Chapter VI., Article I., of the Council was proposed, requiring the Finance Committee to consist of three members.

The minutes of the Council likewise stated that the following candidates, whose applications had been reported to the Association at the second session, were duly elected members.

Georgia.

Charles H. Behre, Atlanta.
Joseph Jacobs, Athens.

Illinois.

Thomas Lord, Chicago.

Indiana.

John Reule, La Fayette.

Massachusetts.

Charles Hurlbert Eddy, Great Barrington.
Arthur Hudson, Newton.

Michigan.

Henry J. Brown, Ann Arbor.

New Jersey.

E. W. Brant, Elizabeth.
Henry O. Ryerson, Newton.

New York.

Henry Aman, Rochester.
Isaac C. Chapman, Newburgh.
James Aug. Darlington, Buffalo.
Julius Imgard, New York.
William T. James, Flushing.
Bernhard Osann, New York.
Henry B. Parsons, New York.
Ernest Reusch, Brooklyn.
Charles E. Reynolds, Brooklyn.
Joseph M. Schmitt, Rochester.
Charles H. Scoville, Tonawanda.

North Carolina.

John Gray Myers Cordon, Tarboro.
P. W. Vaughan, Durham.

Ohio.

F. P. Clark, North Baltimore.
Mrs. E. F. Warren, Bellville, Richland Co.

Pennsylvania.

Alpheus Armor, Allegheny City.
Alvin Backus Armstrong, Smethport, McKean County.
Archibald C. Robertson, Allegheny City.
E. K. Thompson, Titusville.

Rhode Island.

Albert B. Collin, Westerly.
Stephen L. Talbot, Providence.
Mason B. Wood, Providence.

New Brunswick.

Edwin M. Estey, Moncton.

Mr. Feemster read a paper on "Caffeine in Guarana" (see page 569), in answer to Query No. 30, and in answer to a question by Mr. Shinn, stated that he had not extended his investigations to coffee, and, therefore, had no results to report in reference to the amount of caffeine contained in the coffees of commerce.

Mr. Lilly read the credentials, and moved their acceptance, from the Pharmaceutical Association of Quebec, of Mr. Roderic Lower, Vice-President, and H. S. Evans, member of the Council of that Association. The motion was agreed to.

Mr. Roberts read the following report, which, on motion of Mr. Kennedy, was accepted and adopted.

To the American Pharmaceutical Association: Your Committee on Place and Time for the next Meeting of the American Pharmaceutical Association respectfully recommend Washington, D. C., as the place of meeting, and the first Tuesday in September next as the time.

Your committee, whilst travelling a little out of the strict line of business assigned them for consideration, would respectfully recommend to the Association, that in the future it be made a part of the duty of the Committee on Entertainment, to name two or more places for the recurring annual meeting of this Association at each annual meeting thereof.

Your committee further recommend that our Permanent Secretary be instructed to acknowledge to the mayor and corporation of Atlantic City, to the California Pharmaceutical Association, and to the Louisiana State Pharmaceutical Association, their several invitations. All of which is respectfully submitted.

Joseph Roberts,
George J. Seabury,
George W. Sloan,
Charles Bullock,
P. C. Candidus.

Vice-President Ingalls took the chair.

The amendments to the by-laws, proposed by Mr. Sheppard at the preceding session, were ordered for consideration, and on motion of Mr. Bullock taken up seriatim.

The amendment to Chapter VI., Article VI., was read as follows: Add after the word "charged," the words "with the examination of the credentials of delegates and."

On motion of Mr. Cowdrey it was unanimously adopted.

Chapter VIII., Article VI., to be amended by adding to it: "All credentials shall be sent to the Permanent Secretary at least two weeks in advance of the annual meeting."

Mr. Thompson.—Before a vote is taken I would like to inquire what effect the by-law would have upon credentials that fail to be presented two weeks before the meeting; whether they would be ruled out.

Mr. Remington.—Council discussed that point and decided that it would not affect them; that the credentials would not be ruled out; but since such a rule was very desirable it was hoped that delegates would comply with the requirements of the by-law; they would be notified of this requirement, but would not be excluded from the meeting.

Mr. Thompson.—If we have a by-law which says all credentials shall be presented before a certain time, I do not see how the Association can consider such that are presented after that time without again amending the by-laws in order to do it. I think the object of this might be accomplished by simply requesting the associations entitled to representation in this body to pass in their credentials, at least two weeks before the time of meeting, and not make it in the form of a by-law.

Mr. Remington.—It would be satisfactory, I think, if the word "shall" would be changed to "should."

Mr. Thompson.—I accept that.

Mr. Sheppard accepted the amendment to the amendment, and it was agreed to.

Chapter IX., Article II., Section 4, to be amended by inserting in the place of the second sentence the following: "The President's address may then be read, after which the Council shall report the list of properly accredited delegates. The Secretary shall then call the roll, noting the names of delegates and members in attendance."

The amendment was adopted without further discussion; also the amendment proposed by Council to strike out in line 4, of Chapter VI., Article IX. preceding the words "of the Council," the word "and," and to insert in place thereof the words "a complete synopsis of the minutes" (of the Council).

The subject of holding a meeting in California was then discussed.

Mr. Sheppard.—For a number of years many of the members have discussed the question as to the possibility of holding a meeting of this Association in California. We have received urgent invitations from the pharmacentists of California to meet there. It is unnecessary to discuss the principal objections to going there which are, the distance of California from the Eastern part of the country; the expense of reaching there, the time consumed by an individual in going and returning, and the consequent small number of the present members who would be in attendance at that meeting. This question is not a new one to a great many of the members. It was referred by the Council to the Entertainment Committee, and that Committee recommended that it be laid on the table, or, at least, that was the virtual result of their recommendation, but by a large majority of the Council a different action was taken. If the members will remember, that at the reading of the minutes of the Council a resolution was passed, I think very nearly unanimously, that it is the sense of this Council, that if suitable arrangements can be made for meeting in California within the next three years, such a meeting should be held. Now, in order that this matter shall be definitely settled, it must come before the meeting of this Association; if we are to hold a meeting there it is very desirable that the preparations should be made at least two years in advance, possibly three years, in order that the parties may have abundant time to make such business arrangements as they desire to themselves, with that object in view it is that I now bring up the matter. It seems to me very desirable that there should be a meeting in California at no distant day. From a personal acquaintance with the State, I know that the members would have a very enjoyable visit, and from a somewhat extended acquaintance with the coast, I feel that the meeting of this Association would be very beneficial to the men on the Pacific coast. Now, our brethren in that region are, in a measure, isolated from the rest of us. Do we not owe them a duty? We all know from our own experience, that a meeting of this Association in any locality is of wonderfully great benefit to the pharmacists of that location, and if it be a great occasion, it gives them a stimulus which lasts them, many times, for years. Our brethren of the Pacific coast have been asking us to come there, and I think that we must recognize the fact, that if we go there, it will be a comparatively small meeting; but the question arises whether it is necessary, or desirable, at least, for an Association of a scientific character to have always large meetings. Of course it is very pleasant, and the influence of a large meeting is very much greater and broader than that of a small meeting; yet in an Association like this, which has for its legitimate aim scientific objects, it seems to me that we should keep in mind that sometimes a meeting of twenty-five or fifty energetic resolute men accomplishes a great deal of good; possibly more than a meeting of five hundred men who are comparatively pacific. Now, gentlemen, I hope that this matter may be thoroughly discussed, and that we will decide yes or no at this meeting, whether we shall go to California some time during the coming three years. It seems to me that we have left the matter lie long enough, and that now we should take some definite action. It is not likely that for years to come we shall have a larger meeting than we have here at Niagara Falls. If the sense of the Association is that we shall go there, it seems to me that this meeting would be fully representative of the sense of the members of the Association, and that we can judge better here perhaps than at any future time as to how many will go, and whether if we go it will be a successful meeting.

MR. BULLOCK.—While it may be desirable, at some future time, to go to California, it appears to me a question whether it would be judicious for this Association, at this time, to say that they will muzzle themselves by agreeing now that they will go to California within a certain number of years. We have, by adopting the report of the committee, fixed the next meeting and have made it a part of the business of the Committee on Entertainments to look out for the means and ways of going to the place of meeting, and to suggest places to choose from. To leave this matter to them for previous full consideration will be much more wise, as a course to pursue, than to say at the present time that within three years we will go to California.

MR. ROBERTS.—It strikes me that the action taken by us at the present time would not be binding upon future meetings of the Association. That which is proposed to be done can be undone by another meeting, and nothing would be gained. If it was found politic and advisable to go there within three years we would resolve to go; but if a future meeting did not think so two years hence, the Asssociation, when it adjourned, might adjourn to go to some other place; then all this legislation would be at naught and would fall to the ground. I do not think such a resolution passed now would have any binding effect whatsoever.

MR. GORDON.—I think it well that this question has come up at the present time. It gives us time to consider whether we want to go to California or not. Not only that, we will ascertain the amount of cost involved to have a successful meeting there, but everybody connected with the organization may be prepared at some future meeting to vote intelligently upon it. I look upon this discussion simply as a feeler for the future.

MR. COWDREY.—I think that that was the case. While, possibly, the committee we have appointed might not feel it incumbent to recommend San Francisco, they would be willing to do it, if they thought the sense of this meeting was inclined that way. If this is the idea of Mr. Sheppard, I am glad the question has been brought up. I would like to see an expression of this Association as to whether, at some future time, it is desirable to go to San Francisco, or some other point on the Pacific Coast.

There being no motion before the meeting the subject was dropped for the present.

Mr. Gordon.—We have been met very cordially here by the Committee of the Western Wholesale Druggists' Association. Of course, I think that our members would like to cultivate friendly relations with this Association. The objects of the two organizations are different, to some extent. One is a business association; the other scientific; but withal the interests of the two associations are to a certain extent identical. I move that a committee of five be appointed by this Association to meet with the Wholesale Druggists' Association at Cleveland, to express to them our cordial feelings.

The Vice-President.—Mr. Gordon's motion is that a committee of five be appointed from this organization to meet the Western Wholesale Druggists' Association at their meeting at Cleveland, and to express to them our cordial sympathy and good feeling towards them.

Mr. Gordon.—As stated in the beginning, our work is not in the same line. It is confined to scientific matters, while that of the other Association relates to matters of business; but the two businesses—the wholesale and the retail business—are interests entirely in sympathy, consequently I would like to see most friendly relations cultivated between this and the other organization, and with that view I make the motion.

Mr. Shinn.—Mr. Chairman, while it is an undoubted fact that the business of pharmacists is complex, and that there is not only a great deal of science, but at the same time a great deal of ordinary business connected with it, yet it does not seem to me that this Association, as a body, should recognize a mere trade organization. If we felt like responding to the courtesy of their sending a delegation here, it could be done by resolution through the Secretary, without sending a delegation there. We will have nothing to do but to extend to them, according to the mover of the resolution, our sympathy and good feeling. If there is no other business to be done all that could be transacted by resolution by this body, and that would be sufficient. But, as I say, it does not seem to come within the scope of this scientific association to appoint delegates to a trade association.

Mr. Menninger.—I heartily indorse what Mr. Shinn has said about this matter, and I would add one other objection to this resolution. I, for my part, and perhaps there are many others who are in the same predicament, know nothing of the Western Wholesale Druggists' Association, except that it has been formed. Of whom it is composed, what are its objects and tendencies, or its relationships to legitimate pharmacy, I know nothing, and have heard nothing, and I am unprepared to vote on a question of this kind until I am better informed. This Association excludes from its ranks men who are exclusively engaged in the manufacture of patent medicines. I should most positively refuse to vote affirmatively on this resolution.

Mr. Gordon.—If they were simply manufacturers of patent medicines I should be the last one to offer a resolution on this floor to appoint a committee to meet with that body. The Association is formed of the very best druggists in—I was going to say, not only in the West, but in the United States. The wholesale trade, almost entirely in the Western and Southwestern country, is represented. The members of that organization have come here with a very cordial greeting to us, as a matter of courtesy, simply not as a matter of business. Because we have no business connection with them, I made the motion that a committee be appointed to meet with them, simply to return that feeling,—to say that we have the most cordial feeling towards them as a body. Many of them are members of this organization, and some of us are members of that organization. I am in the wholesale drug business, and I am a member also of that organization, and there is nothing in its objects that will at all conflict with this organization, and nothing in our organization that conflicts with them. It was simply a matter of courtesy; a kind way of expressing our good-feeling more than could be done simply through the formal words of a resolution coming through the Secretary. Such a resolution, if offered, would have little effect. Consequently, I have made the motion that a committee be appointed to meet with them. So far as compromising this organization is concerned, I could see nothing of the kind, and feeling in that way, I hope that the resolution will pass.

Mr. Wells.—I do not see anything detrimental to the advancement of pharmacy by accepting Mr. Gordon's proposition and adopting his motion. We, in a measure, naturally ought to have some affiliation with the wholesale druggist. Yesterday the discussion referred to our depending upon the wholesale druggists for furnishing us material, and that we, as pharmacists, ought, to a certain extent, be able to rely upon the wholesale trade in a business way. We are interested in encouraging wholesale druggists to furnish us with good products. I do not see any harm in accepting the motion of Mr. Gordon. It will not prevent the advancement of pharmacy, and I think we ought to encourage intimacy between the two branches.

Mr. Candidus —As this discussion has taken up time without being of any benefit to the Association, I move that the motion be laid on the table.

This motion was seconded.

Mr. Murray.—I do hope that will not pass. That will be discourteous.

Mr. Roberts. I rise to a point of order. A motion to lay on the table is not debatable.

The question being on the motion to lay on the table, a division was called for, resulting in 22 ayes and 34 nays; consequently, the motion was lost, and the question on the original motion was before the house.

Mr. Good.—I fail to see, after the very cordial address which has been delivered here by Mr. Richardson, of St. Louis, why we should not respond in an equally cordial manner to his invitation. Another point thrown out yesterday—a point to which I intended to call attention if some one else had not done it before I had the opportunity, although it is not a point that I care to dwell on very much, yet it seems, from the discussion brought out in a paper read yesterday, it would do us good to associate with the wholesale druggists. They seem to be a little more conscientious than we are as a body. That might be taken as an index that it will do us no harm, at least. I certainly heartily indorse the proposition to accept their invitation to send a delegation in return, and extend our fraternal feelings to them as they have extended them to us.

Mr. Menninger.—Mr. President, I desire to present no unseemly opposition to the wholesale trade or to the Western Druggists' Association, nor do I desire to act unintelligently upon any question coming before this Association, nor do I think it advisable for this Association to act hastily in forming any new alliances or relationships which might be embarrassing to us afterwards. I know very little of this association, and offer no opposition to it, but do ask that we have sufficient time to acquaint ourselves with them. I agree with the last speakers that it will do the wholesale druggists good to associate more with us than they have done. I think that the practice of legitimate pharmacy, the general practice of it in the drug trade should be kept in view. I believe the retail and the wholesale trade must have a common ground where they may meet on such questions, but I do question whether this Association is exactly the road where they should join. I say all this, Mr. President, simply in asking the Association to support the motion I will make in order that we may better acquaint ourselves with the objects and tendencies of this association. I move, Mr. President, that this motion lie upon the table until to-morrow morning. It is a short time, yet it is ample time to talk this over privately, while we go on with the legitimate business of reading our papers.

Mr. Murray.—I rise to object to it, and also to object to Mr. Menninger's assertion about patent medicine alliances. If we propose to exclude patent medicine men, I think we will have to largely reduce our present membership.

Mr. Menninger.—I do not object to dealers in patent medicines. I said exclusive manufacturers of patent medicines.

Mr. Murray.—I think Mr. Gordon's motion ought to carry, and ought to carry now as a matter of courtesy.

Mr. Gordon.—There are gentlemen on this floor who can detail the objects of the Druggists' Association.

Mr. Thompson.—The motion of Mr. Menninger being one and the same as that already voted down, I think it cannot be entertained.

Mr. Menninger.—A motion to definitely postpone is not the same motion as a motion to indefinitely lay upon the table.

Mr. Gordon.—I have this to say: that there are gentlemen on this floor, if Mr. Menninger wishes to be informed as to the objects of the Western Wholesale Druggists' Association, who will give him the information here, and save the bringing of this subject up for discussion at a future meeting. I am not as well acquainted with the organization as some other gentlemen. I presume Mr. Kline or Mr. Lilly could explain very fully the objects of the Western Wholesale Druggists' Association and save discussion at a future session.

At this point the President, Mr. Heinitsh, resumed the chair. Mr. Bullock contended that Mr. Menninger's motion was virtually a renewal of the one previously disposed of. It was ruled out of order by the Chair, and the question was ordered on the motion of Mr. Gordon, that a committee of five be appointed by the President to attend the next meeting of the Western Wholesale Druggists' Association at

Cleveland, and to express to them the cordial sympathy and good feelings of the American Pharmaceutical Association. A division was called for, which resulted in 45 ayes and 20 nays. The motion was, therefore, carried.

Mr. Menninger.—With no expectation that the resolution will be passed, but with the desire to place it upon record, I move that the committee be composed of wholesale druggists—members of this Association.

This motion was seconded.

Mr. Gordon.—I object to that. I would like to see that committee a proper representation of this Association. I do not wish to see the object stultified by the passage of such a motion as this. I want to see a representation squarely and fairly of the American Pharmaceutical Association.

Mr. Kline.—In opposition, I would like to draw attention to this: that there are many members here who are acquainted with the character of that association, and while there are many, perhaps, who are unacquainted with it, and who are not wholesale druggists, I think it would be as well to send a delegation of the latter, that they might become so.

Mr. Menninger.—The gentleman's remarks remind me very forcibly of a man who marries a girl with a hope that he may get acquainted with her after he had married her.

Mr. Kennedy.—I hope that this discussion will cease. We are wasting very valuable time. We have, at this meeting, only a few hours of time in which to discuss scientific matters, the most important object for which we have assembled here, and we have now wasted about an hour or two on questions which benefit nobody. Now I hope we will get down to work. We have but this morning and to-morrow morning to finish up our business. We have valuable papers to be read, and they will probably have to be rushed through without discussion or the expression of an opinion in consequence of such unnecessary discussion, which benefits nobody.

Mr. Wells.—I move that Mr. Menninger's motion be indefinitely postponed.

Mr. Wells's motion was agreed to, and the President stated that the committee would be appointed later in the session.

Mr. Sheppard.—While I do not wish to intrude, I want to bring up this California mattter before the Association adjourns. The motion of Mr. Gordon was a virtual interruption of our discussion as to whether we should have a meeting in California, and, as a continuation of the old discussion, I move that a committee of three be appointed by this Association, to report at the next Annual Meeting as to the feasibility of meeting in California.

The motion was seconded by several.

Mr. Sloan.—I move to amend by referring that matter to the Committee on Entertainment, to report next year.

The question was called for by several members, and, being taken on the amendment, it was lost. The question on the original motion of Mr. Sheppard to appoint a committee of three was agreed to.

Mr. Llewellyn offered the following resolution, which was seconded by Mr. Pettit:

Resolved, That, after three years' experience, we are satisfied with quinine free of duty, and ask that it shall remain free.

Mr. Bullock.—I hope that resolution will not be entertained by this Association. It is a matter purely of business, and I think it ought not to be entertained.

Mr. Llewellyn.—The object of this resolution is simply to express an approval of what has been done. We are satisfied with it, and desire quinine shall remain free of duty.

Mr. Thompson moved that the resolution offered be laid on the table, and his motion was agreed to.

Mr. Cowdrey read a paper on "Active Diastase in Extract of Malt," and proceeded to make some experiments with a certain commercial brand of extract of malt, showing the liquefaction of starch-paste. The Secretary objected to the reception of the paper on the ground that the process of its manufacture was not given, and that the name of the extract mentioned in the paper had been copyrighted.

Mr. Cowdrey.—The extract of malt is not copyrighted; it is perfectly free, and the process is the same as that of Liebig, except that it is made at a low temperature.

Mr. Menninger.—This difficulty about an article which is not exactly in a legal sense a proprietary article, the process not being patented, could be obviated by Mr. Cowdrey omitting in his paper the commercial name and simply calling it a sample of malt here presented. That would obviate the difficulty of publishing a proprietary article in our Proceedings.

Mr. Cowdrey.—I should be willing to give you the entire formula, and had this in my mind when I was making the extract of malt. I thought it was worthy of publication, because if the heat is raised it destroys the diastase. Many others are making extract of malt by using too high a heat. I noticed, in the last number of the "Pharmaceutical Journal," that this same matter is being agitated abroad—that of a saving of the active diastase by lowering the temperature in evaporation.

Mr. Prescott.—I am glad that this subject of testing malt for diastase has been brought before the Association. I should be glad if pharmacists selling extract of malt almost every day would acquire the habit of occasionally testing articles on sale of different manufacturers, as such a course will not leave them at the mercy of the latter. The true method, of course, is the dynamical assay, or testing for diastase by its effects. It cannot be separated—perhaps has never been separated. This simple test—as simple a test as can be made—is to take of the extract of malt one hundred parts, more or less, and if you please, to begin with, one part of dry starch, gelatinized. Digest a quarter of an hour in a temperature near 150° Fahrenheit. This is the limit. Then test with iodine for starch. Now if no starch is present it is shown that some diastase is present, and this is greatly to the credit of the extract of malt, because the process of manufacture that will leave the diastase in is such a careful method as will also leave dextrin and sugars uninjured. By experiments which I have seen made, it is very evident that not only heat, but incipient fermentation—even long digestion—might injure the diastase very rapidly. Of course, after the test I have mentioned showing the presence of enough diastase to convert one per cent. of starch, it might be followed out further, if necessary. 25 parts of starch to 100 of malt, then 50, and so on; the quantity of starch converted can be readily ascertained. I think the temperature of about 110° Fahrenheit is probably the most suitable for digestion.

THE PRESIDENT.—We will postpone the further discussion of this paper for a few moments while Mr. Saunders introduces Professor Carpenter to the Association. The Association will please rise.

MR. SAUNDERS.—Fellow-members of the Pharmaceutical Association, I have the hónor to introduce to you on this occasion a distinguished visitor from Great Britain, a gentleman whom I am sure you have all known by reputation for many years; one who has devoted a long and busy life to the interests of science; most of us have known him long from his writings on physiology, others of us who have taken an interest in deep-sea soundings for creatures on the bottom of the ocean in various parts of the world; a gentleman who has shown more than perhaps any other living man the development of science; but as pharmacists, the principal writings of our venerable visitor, Dr. Carpenter, that interest us, are his "Microscopical Studies." I have very much pleasure in introducing to the Association Dr. William B. Carpenter, of London, who has been invited by your Council to be a guest with us on this occasion.

PROFESSOR CARPENTER.—I feel much honored, sir, at the kind reception and at the kind invitation which this meeting has been good enough to extend to me, and by the kind reception which you have accorded to me. It would have been a great pleasure to me to have taken some part in your deliberations had my time permitted, but having found that during my stay in this neighborhood it was really necessary that I should take an interval of rest between three or four different meetings, which I stand pledged to attend, I feel that I could not undertake any further attendance of the same kind; but still, having had this kind invitation conveyed to me, and being assured it would be a pleasure to the members of this Congress to welcome among them one whose name is known to them, and who has always taken a very great interest in the promotion and education of the great profession, for I include in the medical profession the pharmaceutical—that great profession which has for its ends and objects the physical well-being of the great population of this country; having, I say, sir, been assured that it would be a pleasure to welcome me among them, I could not feel otherwise than honored, and was quite glad of the opportunity thus afforded me. With regard to the fine words which have been said in welcome, I would say to the gentlemen present that I have been mainly connected during my active life with scientific education. I think, something like forty-seven years ago, I became a teacher in the Bristol Medical School, and afterwards removed to London, and in a connection of thirty-six years with the University of London, I have very considerable opportunities of seeing the gradual elevation which has taken place in the character of the medical profession in our country, and in the character of the pharmacists who minister, so to speak, to the wants of physicians and surgeons. I am extremely glad to find that the same gradual process of elevation is taking place and is being carried on here, but particularly glad to find that you have so wisely adopted a principle of my friend of the great scientific association, a meeting of which I had the pleasure of attending at Montreal, that you have so wisely adopted that principle of combining the residents of both divisions of this great North American continent. But, sir, I would most cordially wish you God speed in all this great work which I see laid out in the programme which I have here before me, and particularly in that last and most excellent object expressed in the seventh clause, "To create and maintain a standard of professional honesty equal to the advancement of our professional knowledge, with a view to the highest good and greatest protection to the public."

I rejoice, sir, that this Association is not merely for the material well-being of the pharmacists, but for the well-being of the public, and that your members fully recognize that what is best for the public is best for themselves; best for themselves I am quite sure in material interests, and best for themselves in those higher moral aspects, the superior value of which we must all in our secret souls, I am sure, most fully recognize. And, sir, it is in this progress of moral elevation, as well as the progress of scientific knowledge, that I have the most cheering hope for the future. When I look at the medical and pharmaceutical literature of the American continent of the present day, and compare it with that of former years,—for I well remember it, having been the editor of the "British Quarterly Review" in former years, when I was accustomed to receive large numbers of American, as well as British, periodicals,—I say, that in comparing the current and former medical literature, it is just like the comparison between the elevated sciences of the present day to the limited and inchoate scientific conceptions that we had forty or fifty years ago.

Everyone is aware of the rapid advance in general principles in the scientific progress of to-day—I recognize the rapid progress in the scientific press, and in the medical press I recognize a much more clear test as to what medicine and what remedies can be expected to effect. It was with great satisfaction that I had an invitation the other day to the great Sanitary Congress in the west of the Province of Ontario, in which I saw that the members were precisely the same, and I do not know anything that more completely shows the interest in this medical profession, than the earnest advocacy of sanitary reform and preventive medicine.

Now, sir, preventive medicine is, of course, to do away, ultimately, with the need of pharmacists, and yet I am sure that there is no one among you who would not feel that that is a great object ultimately to be aimed at—it will not be in our generation (laughter), so that vested interests have a considerable field before them; but still you all see that that is the ultimate aim, that the people should die simply of old age, instead of dying of disease; but there were always diseases, and they were always deemed to be long hereditary tendencies that my friend, Sir James Paget, has written his essay upon, hereditary diseases. These long hereditary tendencies, acting not for generations, but for hundreds of generations, have made the tubercular diathesis, things which may take hundreds of generations to eradicate. In the meantime there is a large field for pharmacy, and there is, I say again, an abundant field for the elevation of medical and pharmaceutical science in the great distinct recognitions which, I have rejoiced to see, is rapidly growing, a more distinct recognition of what medicine can do, and what it cannot do.

With regard, sir, to one point which has been alluded to in the kind welcome given me, as to what I have done to promote useful advancement of science, I may mention, and it may be of interest to some present, that I believe that I am almost the only living man, with the exception of Mr Powell of the firm of Powell & Lealand, whose name is well known now as a constructor of the very highest class of microscopic objectives, who was present at the birth, so to speak, of the achromatic microscope. It so happened that an uncle of mine, being engaged in the optical business in London, was cognizant of all that was being done about fifty years ago. Now half a century ago the first achromatic lenses were being constructed in London, the constructor of them being acquainted with what was being done elsewhere; it was rather before that that work was being done in Paris, and before that in Italy; but you have seen doubtless that these men, working separately and independently, have contributed to the production of the achromatic microscope. You all know what that instrument is now, and I have no doubt that many of you are perfectly conversant with the use of it, and I will only say that you may get in London for seven or eight pounds, an instrument very much better fitted for scientific research than could be obtained for forty or fifty pounds thirty years ago. And I do take some little credit to myself for having been accustomed to urge upon our constructors of microscopes in England, not only the highest attainable perfection, but the production of instruments for good honest work. (Applause.) For those instruments of the very highest attainable perfection, that is, for lenses of the largest annular aperture, are in my opinion, and I speak with perhaps larger microscopic experience than those present, are thus capable of good ordinary work, for ordinary scientific research and operations in that direction. I would impress that very strongly upon you, because in this country you are going through a sort of phase that we, in England, went through twenty years ago. There is a class of gentlemen that I should speak of only with respect, and that in England we call diatomaniacs. It is a fact that the solution of the extreme diatome is one of the ultimate aims of the microscopists. . Now we value that attribute of physiologists for what it is worth. It is like the running of a race-horse for speed. That is the one quality of the microscope pushed, so to speak, to the extent of sacrificing other qualities which are of more importance to scientific microscopists, more especially with which I have been accustomed to penetrate, with a focal depth and power of seeing into objects as we see with our eyes. Why if it is pushed to that extent then it injures the objective. I have said these few words, sir, because it is a point upon which I feel I might dwell with some degree of pleasure and authority, and I am very desirous that those who take up the microscope, whether for the purposes of their profession, or, as I hope many do, for the sake of occupying spare time and cultivating their own minds and the minds of their children. I will say to them, sir, that the microscope, with objectives discredited by these diatomaniacs, may do very good work indeed. My friend, Professor Elliott, of Philadelphia, whose great work on the rhizopods was published by the United States Government, says in his preface to that work, that the greater part of it was done with a peculiar economical microscope, which cost, I think, in our country, about six or eight pounds; and he only had recourse to objectives of the higher power and greater capacity, now and then, to verify something that he had observed with others.

With these few words, sir, I must wish you all success in your work, and a kind farewell, corresponding with the kind reception which you have accorded to me. (Great applause.)

THE PRESIDENT.—The Association will resume the discussion of the paper presented by Mr. Cowdrey.

MR. COWDREY.—I want to say, sir, in regard to the article in the British Pharmaceutical Journal that the writer there makes mention of the same fact that I do here, that of the destroying power of a high heat, and he goes a little further and takes a point at 175°. I have no doubt but that it can be accomplished at the height of 175°, or possibly 180°, but 165° is really the point of safety. Now let me say that that preparation of malt is not a trade-marked proprietary medicine,* and I do not suppose that anybody that knows me dares say that I would have anything to do with a trade-marked or proprietary article. I would like, right here, to ask, as there has been considerable agitation on the subject, what the position of this Association is on trade-marking and keeping medicines from the pharmacists, so that we cannot legally either prepare them or sell others made equally good, without being liable to imprisonment and fine. I should like to know what action the Association has taken, and where they stand.

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* It was subsequently ascertained that the name of the preparation in question was registered as a trade-mark, and it is, therefore omitted.—SECRETARY.

Mr. Menninger.—I believe this Association has taken no definite action in regard to preparations that are patented or copyrighted, but it undoubtedly has been the policy of this Association and its action to prevent a manufacturer of articles, of which he is the exclusive proprietor, from using this Association as a medium for advertising. For that reason I did, in a friendly spirit, suggest to Mr. Cowdrey that the name of the manufacturer should be dropped, and he should simply speak of a sample of malt before us. I expect the older members will recollect how we came, to use a homely phrase, "into shallow water" on one occasion, by having a paper read which alluded to samples of different manufacturing pharmaceutists, and the controversy which resulted. It was a little embarrassing to several members of the Association. Now, while I am up, I hope sincerely, and I do so in appreciation of Mr. Cowdrey and of his honest, valuable, and faithful labor in that matter,—I do hope that the reading of this paper and the subsequent discussion thereon will not be used by the manufacturers of the sample of malt on hand as an advertising medium.

The Secretary.—Dr. Menninger is not quite fully informed in regard to the action that the Association has taken with relation to such matters on previous occasions. In fact, I may say that the opposition to this secrecy in pharmacy originated in this Association, or that our Association was born with it in 1852. A code of ethics was then adopted in Philadelphia, in which you find the words are used that quackery and dishonorable competition in business are discountenanced. Again, in the same code, it is distinctly asserted that no pharmacist should have secret formulas, and that the formulas which are used by pharmacists for pharmaceutical preparations should be for the use of every other pharmacist. In the year 1853 there were some very stringent resolutions passed, aiming at discouraging by every honorable means the use of nostrums; to refrain from recommending them; not to use any means of bringing them into public notice; not to manufacture any medicine the composition of which is not made public and to use every opportunity of exposing the evils attending their use, and the false means employed to introduce their consumption. In the year 1854 a committee appointed to report on secret medicines, reported substantially the same sentiments that had been indorsed by the Association before. In 1856 a constitution was adopted, somewhat similar to that which we have at the present time, and in that constitution we find, in section 3, article 1st, as one of the declared objects of the Association, to be, the improvement of the science of pharmacy, by diffusing scientific knowledge, etc., and in section 5, to suppress empiricism, with a view of restricting the sale of medicines to regularly educated apothecaries. The publication of a code of ethics had been discontinued without any mention being made thereof upon our minutes. That subject was brought up in 1868, and the Association declared then that the code of ethics was superseded by and embodied in article 1st of the constitution, thus re-affirming everything that had been done since 1852. Again, in 1870, there was added to the constitution that clause that has been a few moments ago commented upon by Professor Carpenter, "to create and maintain a standard of professional honesty equal to the amount of our professional knowledge," etc. Now, sir, the older members of the Association will remember how the exhibitions have gradually grown, from twenty or twenty five years ago, when there were only a few articles,—a few small bottles brought to the meeting, and shown usually in illustration of papers read. These exhibitions have gradually assumed quite considerable importance. From the very beginning it was the object, or it was at least well understood by those who served on the Committees on the Exhibition, that no article whatever that could be classed as a secret medicine, or that could be charged with empiricism, should be reported on. This practice has given the Association some difficulty on former occasions. On account of the gradual increase of such articles some members, in 1877, at the Toronto Meeting, made a motion to discontinue these exhibitions, and the subject was then referred to the Executive Committee for consideration. The report of that committee was in favor of continuing the exhibition, under certain restrictions, and these restrictions were adopted by the Association in 1878, and are as follows: "The following articles shall not be admitted to these exhibitions: Proprietary and patented medicines, medicinal and pharmaceutical preparations the names of which have been copyrighted or the complete working formula of which is withheld, and such chemical preparations and mixtures which are offered under other than their proper scientifically recognized names." Mr. President, when I reflect on all this, I must say that our Association has adopted the proper plan. It is opposed to secrecy in medicines, and I say it here, before this Association, that we exclude from our exhibitions articles which are recommended by a good many professors of colleges of medicine throughout the United States. (Applause.) That is the position which the American Pharmaceutical Association has taken from 1852 to the present time, and it has never been questioned. I regard this clause in our by-laws concerning the articles deemed unworthy for exhibition, as a good one, and more than this when we come to the exhibition room and find pharmaceutical preparations there of which the formula has not been previously published, and any member of this Association demands the formula from the exhibitor he must be furnished with that formula, or else that article can never be exhibited again at a meeting of this Association. That, sir, is the position which we take. (Applause.)

Mr. Cowdrey.—I had no idea when I came here that I was going to kill two birds with one stone. I came here with the full determination to continue the war on these trade-marked preparations, and do not believe I need defend my position here at all, because I am too well known as to the stand I take in the matter, without any personal feeling whatever. I believe this is a good preparation, and there is nothing that would please me more than to have the Association remember that the proper precaution in the manufacture of the extract of malt is a much lower temperature than that which has ordinarily been applied.

Mr. Cowdrey's paper was, on motion of Mr. Shinn, referred to the Publishing Committee.

The report of the Committee on the Recommendations contained in the President's Address, was read by Mr. Markoe, as follows:

Your committee recommend that the sum of $200 be placed at the disposal of Council to defray such expenses that may be incident to their duties.

Your committee further recommend that the Committee on Entertainment be made a permanent committee, and that the expenses of this committee shall be defrayed by their receipts, and in cases of a deficiency, such deficiency shall be paid from the funds of the Association. Should any surplus remain in the hands of the committee such surplus shall accrue to the account of the Entertainment Committee.

We think that this committee should consist of five members, three of whom should be chosen from the same place. The expense to the members of the Association for entertainments shall not exceed *five dollars.*

Your committee recommend that the proposition to change the time of meeting from September to August be left to the will of the majority of the Association.

Your committee are of the opinion that it would be best for this Association to take no action as a body regarding the stamp tax on medicines.

Your committee recommend that the Council be authorized to report suitable names from among those who have distinguished themselves in the ranks of our own or kindred scientific pursuits, for election to honorary membership.

(Signed) W. J. M. Gordon,
Charles Bullock,
George F. H. Markoe.

In regard to these propositions the committee are unanimous. In regard to the proposition to change the by-laws we have two reports, a majority and a minority report.

I will call your attention first to the majority report.

The recommendation to change the time at which the newly elected President of the Association should take his seat, has received the consideration of the committee. While there appears to be no objection to the proposed change, your committee are unable to see sufficient advantages to be gained thereby, to disturb the custom which has prevailed since the organization of the Association.

(Signed) Charles Bullock,
W. J. M. Gordon.

I regret that I cannot agree with my fellow-members of the committee in the matter of changing the order of business, by having the election of officers take place at a later period in our proceedings. They do not object to the proposed change, except on the ground that it will disturb the old order of things. I feel, however, that the advantages pointed out by the President to be worthy of the serious consideration of the Association, and therefore very respectfully ask a favorable action on the proposed change.

(Signed) George F. H. Markoe.

On motion of Mr. Good, the report was accepted, when Mr. Sloan moved that the recommendations be taken up seriatim. This was agreed to, and on motion, the sum of $200 was placed at the disposal of the Council, to defray such expenses as may be incident to their duties.

The second proposition, referring to the Committee on Entertainment was read, and Mr. Diehl moved as a substitute for the committee's recommendation, that for the ensuing year a special Committee on Entertainment, consisting of five members, be appointed.

Mr. Gordon.—The committee considered that matter, and thought if there was a permanent Committee on Entertainment, it would have a better effect than simply a temporary committee, for the reason that the committee, becoming acquainted with the members and the wants of this Association, would do the work more efficiently than a committee appointed from year to year. If it be made permanent, it is a matter of no consequence, as it can be abolished next year, and in recommending now this committee which has got everything into good shape, it was done so with the end stated in view.

The Secretary.—I would call the attention of the Committee on the President's Address, to the fact that the adoption of this recommendation at the present time is utterly impossible, because it involves an amendment to the by-laws; amendments to the by-laws have to be properly offered as such, and then lie over for one session, consequently it cannot be acted on now; it would have to be offered in proper shape, perhaps to-morrow, when it would have to lie over for a whole year, for to-morrow is the last session, while continuing it a special committee, it can be acted on now.

MR. MARKOE.—We considered that it should take its usual course.

THE SECRETARY.—In its present shape the recommendation is not offered as an amendment to the by-laws; you have to specify in precise language what you want.

MR. MARKOE.—We will have it all right.

THE SECRETARY.—You have to offer amendmends in writing in the form in which they are proposed to be adopted. Every amendment to the by-laws must be thus offered.

Mr. Shinn stated that he would offer the committee's proposition as an amendment to the by-laws, if some one would second it.

Mr. Diehl stated that his proposition was an amendment to that of the committee, and that it included everything recommended by the committee, with the sole exception of the permanency of the Committee on Entertainment.

MR. SEABURY.—I met that committee last night and placed our difficulties before them. The reason I would suggest for its being a permanent committee is, because in making up our programmes, we become impregnated with the ideas and wants of the Association; of course it is subject to good behavior, and everybody knows that the committee can be changed if permanent; it is going to do whatever work it has easily. There will be no trouble about it. But this amendment I would like to put in a little different shape, by stating that three of the members should be localized, that is, should be in some city where they can meet together, talk together, and act together, and two from the locality, if possible, where we meet. The difficulties that surround the work of this committee cannot be clear to any one except to those who have made it a study, and it is no light task. That committee should be independent. I understood, that its work was to be referred to Council for criticism. The moment you do that you might as well have no committee. If the chairman of this committee does not carry out the purposes for which the committee is appointed, why change the chairman? You can always find good men in the Association; there are abundant members who can qualify for that place, but if possible have that committee the same each year, in order that they may not get too much new material so as to be obliged to teach them as to their duties. The Association should select such men as are calculated to do justice to a subject of this kind. It is no small matter, and that is one reason why it should become a permanent committee, and not have to change at the will of the Association This committee should be so constructed that it should be responsible to the Association, and not to any other special committee or to Council. I am satisfied that the Council are in perfect accord with this committee, and yet at the same time it should be left so as to do its own work and be responsible in itself. A sentence was put in the report in regard to a deficit; in my opinion by no management could a deficit occur in the working of this committee. A surplus should always be shown, more or less, and I would like to state, for the gratification of the members of the Association, that instead of asking the Association to make up a deficit, we have done a part of the work of the Association ourselves to the extent of not less than $150, and that there will be a surplus of from $350 to $400. The only thing I regret is, that our programme could not have been carried out as we had arranged it. There are gentlemen here that require an explanation. As the chairman of that committee I am very happy to give it. We made every arrangement in regard to the carriages, and we have a contract in writing which is good before the law; but they have seen fit not to carry out that contract. That is not our fault. The Association is right, but you must not blame us for any irritation that may have occurred in that matter. I refused to submit to an extortion of $2 each, and if there is any responsibility in this matter I will make it a personal matter to have them make good the difference. I do not care whom you elect, you must deny yourself if you are on the committee.

Mr. Shinn.—The gentlemen will understand that it was to expedite the business of this meeting. This can be done without any change of the by-law, but in order to adopt the report now you will have to change that one word and appoint a special committee at this meeting. It will not interfere with having it made a permanent committee without a change of the by-law.

Mr. Seabury.—Very many members are not familiar with the work of this committee, and that is why I ask for your indulgence in order to give you the explanation. You must make it independent, because that is the only way it can work for the interests of the Association.

The question was taken on the amendment offered by Mr. Diehl, and it was agreed to. The motion as amended was then likewise adopted, and the President stated that he would appoint the committee in the course of the session

There being no special recommendations in regard to the suggested change of the time of meeting from September to August, and in regard to the stamp tax, no action was deemed necessary. The majority and minority reports, relating to the installation of the President, were read.

The Secretary.—I do not see, Mr. President, how we can act upon this. The majority report is in favor of leaving the time undisturbed; any change proposed would involve changing the by-laws.

Mr. Diehl.—The minority report proposes a change of the by-laws.

The Secretary.—It does not say so. Every amendment to the by-laws must be proposed in writing, and that certainly has not been done.

Mr. Diehl.—I move the adoption of the majority report.

The Secretary.—I second that motion.

The question being on the motion of Mr. Diehl, seconded by Mr. Maisch, to adopt the majority report, a division was called for, resulting in the adoption of the report by a vote of 41 ayes to 10 nays.

Mr. Sheppard.—I was out of the meeting at the time action was taken on the recommendation of the committee as to the setting apart of $200 for the expenses of the Council. As I was not present I would like to have that reconsidered, and would make a motion to that effect, and state my reasons for it in advance. The main object of that recommendation is, that our very worthy Secretary of the Council should be compensated to a certain extent for the amount of absolute manual labor he has done for this Association. In the first year he has done an amount of labor which, I think, would occupy, fairly stated, one month of the year. I think he should be compensated for that by a special appropriation of at least $100. There is always connected with the position he has occupied so many years a great deal of work; and while other officers of the Association have a salary,—and very properly so,—I claim that this is also a position that deserves consideration in that direction, and that should not be left indefinite—$200 are to be used by Council for all their expenses, stationery and certain incidental expenses that may come up—the Council has already voted to pay the travelling expenses of the Finance Committee, which will take a large slice of that sum, and would leave only what was left after the incidental expenses had been paid to recompense this worthy officer for his labor. Now, my hope is, that the Association will make an appropriation for him for his services for the past year, and will make it a position where a regular salary shall be given. With that object in view, I move to reconsider the vote by which that recommendation was adopted.

MR. BULLOCK.—I would like to say, as a member of the committee having in charge the President's address, that this committee did not make that recommendation without a consideration of the whole subject. They sent for members and inquired of them whether that duty or work spoken of by Mr. Sheppard was a part of the Secretary's duties, and they were informed that it was not the duty of the Secretary to correspond with the members and perform this duty. For the present year it so happens that the Council have appointed their Secretary to do that duty. Another year it may appoint somebody else, therefore we thought it best to put this money in the hands of the committee to pay whoever it shall appoint to do the work.

MR. SHEPPARD.—I do not wish to occupy too much time in this matter, but perhaps it might be put into another shape. I withdraw the motion I have made, and make another motion to the effect that one hundred dollars be paid to Mr. Kennedy for his services as Secretary of the Council during the past year.

This motion was seconded and agreed to, and the report of the Committee on the President's Address, as amended, was then adopted as a whole.

Vice-President Blanding occupied the chair.

Mr. Rosenwasser then read a paper on "Percolation" (see page 519). After a portion had been read, the author was requested to give an abstract of the paper, owing to its great length. Mr. Rosenwasser continued to read, and a motion was then made by Mr. Good that the further reading of the paper be discontinued, and that it be referred to the Committee on Publication. The question being on the motion, a division was called for, which resulted in a vote of 16 ayes to 7 nays, and the paper was referred.

MR. ROSENWASSER.—The paper is so long that I cannot expect the members to remember all the points, but one point follows another, though they must all be observed before you can enter upon a thorough study of the subject. You cannot expect to know percolation in two minutes' time. I did not expect to lecture on the subject.

MR. GOOD.—I do not wish to be misunderstood. Mr. Rosenwasser has some peculiar points that he wishes to state to us, indepeadent of his paper. I would be only too glad to hear him.

Mr. Markoe.—I am also urging this for the reason that the work of this gentleman is of great interest and the points that he is to give us will be of great value.

Mr. Rosenwasser.—The discussion of the subject of this paper would be one of the most important as to whether I am right in my view or whether the previous view, still retained by many, is correct. If the gentlemen here think as I do, they would certainly hear the paper for the purpose of discussing it.

Mr. Markoe read a volunteer paper, by Professor Patch, on "Gentiopicrin" (see page 568), which was referred to the Committee on Publication.

Mr. Bedford read a paper on "Commercial Salts of Bismuth," in answer to Query 15 (see page 563); also one on "Commercial Creosote," in answer to Query 3 (see page 573). Both papers were ordered to take the usual course.

Mr. Remington.—I have given some attention to testing for phenol, and have found the most reliable test to be bromine-water, which forms the ter-bromide of phenol. With creosote I have got no precipitate whatever by bromine-water; the solution was hardly distributed; but with phenol a white precipitate is obtained, depending, of course, upon the quantity of phenol present. I was not aware that there was a similar precipitate obtained with creosote.

The Secretary.—I should like to ask Professor Bedford whether he has made any comparative experiments and examinations between the different kinds of wood creosote. It is well known that some of the creosotes in the market are prepared from beechwood tar, while others are prepared from the tar of other kinds of woods, and since, at best, creosote is not a pure chemical compound but only a mixture of various compounds in different proportions, it is very obvious that the properties are apt to vary to a certain extent. Some years ago there was quite a discussion in regard to the variation in the properties of certain kinds of English and German creosote. The point was raised at that time that a certain creosote was made from the tar of coniferous woods containing hydrocarbons, which were not present in the creosote as obtained from beechwood tar.

Mr. Bedford.—In regard to this, I would say that all the specimens I have are either labelled beechwood creosote, or they are phenols. The samples got in the exhibition-room instead of getting here; I have them all there in tubes to show. But none of my experiments, and I repeated them a number of times, differ from what I have stated in the paper.

Mr. Saunders read a paper on the "Germination of Seeds of Medicinal Plants," in answer to Query 12 (see page 565), which was referred for publication.

Mr Gregory.—I may mention a practice of a celebrated Edinburgh physician in this connection. It was his practice in sowing seeds to cover them with colored glass. I rather think it was blue glass; but that story I read long before the famous blue-glass theory was advanced in this country. I know his practice was to cover with glass and to preserve the moisture. Perhaps that may assist the germination of the seeds of doubtful origin.

Mr. Saunders.—All these seeds were obtained from Europe, and only a small proportion grew. As I said, I attribute the failure of the seeds to grow to their age, and am convinced, from my experience with the seeds of the large forest trees, shrubs, and other plants, that this is the fact. If seeds are obtained fresh, are allowed to become dry, and are put in the ground where they will be protected from the sudden changes of temperature, as a rule, the greater proportion of them will grow, I think.

MR. SHINN.—I would like to ask if there is not a difference in the germination of the seeds. We have been told that seeds found in the Pyramids have grown after thousands of years. Whether any of these medicinal seeds have what you might call a definite life is a question which I would like information on.

MR. SAUNDERS.—That is an important point, and one to which I wish to reply. There are many seeds that lose their vitality after the first year; there are others that retain it for several years; but to carry out a series of experiments which would demonstrate the relative vitality of different seeds and of different plants would take more than an ordinary lifetime, and a great deal more than I could ordinarily undertake to give to the subject.

MR. REMINGTON.—I would like to ask whether the seeds were previously soaked in water. It occurred to me with regard to some of the seeds—those that are very hard, for instance, the colchicum—would require a previous soaking.

MR. SAUNDERS.—I am not positive about colchicum seeds, but seeds of that character are treated with scalding water before soaking, and they are allowed to stand in water for an hour or so before sowing, so as to permit of their swelling.

THE PRESIDENT.—Mr. Saunders, I think I can procure you some seeds of the *Polygala Senega.*

MR. GREGORY.—There is a great difference of opinion among practical horticulturists about the length of life of seeds. I dare say any considerable inquiry amongst horticulturists would afford information upon the subject. I have heard that all perennial seeds should be sown in the fall.

MR. SAUNDERS.—In reply to the remarks of the gentleman, I should desire to continue my experiments somewhat longer before answering all the inquiries. I think that, in many districts, seeds might be procured with comparatively little labor by the members residing in those districts, which might be sent and sown; but unless there is some community of help in this matter it is very difficult to carry it on to success.

MR. KLIE.—With regard to old seeds, I have read in papers that seeds from Egyptian mummies, where they had no doubt remained for thousands of years, have been sown and have germinated. That is sowing seeds under difficulties with good success.

MR. MENNINGER. I believe that the report of that occurring referred only to stramonium. I have never heard of any other seeds. That is the only record.

MR. KLIE.—The seed that I referred to was wheat; that germinated after three thousand years.

A MEMBER. The chestnut has to be gathered immediately off the tree and put in sand at once. If allowed to remain forty-eight hours it loses its power of germinating, especially in dry weather.

THE SECRETARY. The castanea—the true chestnut?

A MEMBER.—In the chestnut season you will find that they will not germinate—not one in four. But if they are immediately taken out of the hollows, covered with sand, and retained there until ripe, they will germinate very nicely.

THE SECRETARY.—I was going to say that I purchased chestnuts and found them to germinate; that is, I raised at least one or two saplings as many for my purpose as I wanted. I did not pay any attention to whether all would germinate or would not. I have had as bad success with aconite as my friend, Mr. Saunders. I have tried for two years to raise some of the plants, so as to grow the root myself, but not a single seed has germinated.

Mr. Lloyd.—I endeavored to germinate damiana a year ago. I obtained nearly a quart of the seeds, and the plants seemed to have matured. I could not get a single plant.

Mr. Llewellyn.—I have germinated that seed after soaking in a very diluted solution of ammonia.

The Committee on Queries stated that a volunteer paper on "Fluid Extract of Hydrastis" had been received from a gentleman who is not a member, and that, in the judgment of the committee, it was deserving of attention.

On motion of the Secretary the paper written by Charles Spenzer, of Cleveland, was read by Mr. Remington, and was then referred to the Publishing Committee.

The President announced the appointment of the following committees:

Committee on Entertainment.—G. J. Seabury and T. J. Macmahan, New York; W. H. Rogers, Middletown, New York; John A. Milburn, Washington; Robert Cowdrey, Chicago.

Committee on Meeting in California.—S. A. D. Sheppard, of Boston; T. Roberts Baker, Richmond; and Joseph S. Evans, West Chester, Pennsylvania.

Committee to Visit the Western Wholesale Druggists' Association.—W. J. M. Gordon, Cincinnati, Ohio; Charles Bullock, Philadelphia, Pennsylvania; William Saunders, London, Ontario; E. H. Sargent, Chicago, Illinois; E. Shellentrager, Cleveland, Ohio.

The Association then adjourned, to meet to-morrow morning at 9 o'clock.

Fourth Session.—Friday Morning, September 15th.

President Heinitsh called the meeting to order at the appointed time. The minutes of the third session were read by the Permanent Secretary, and on motion approved. The minutes of the Council were read by Secretary Kennedy, and on motion approved. These minutes give the following information:

The following pharmacists, proposed at the third session of the Association, were elected honorary members:

Thomas Greenish, London.
Peter Squire, London.
Joseph Ince, London.
Richard Reynolds, Leeds.
George F. Schacht, Clifton.
Carl Schacht, Berlin.
Christian Brunnengræber, Rostock.
J. von Martenson, St. Petersburg.
Cav. Niccola Sinimberghi, Rome.
Michael Carteighe, London.
George W. Sandford, London.

Chapter VI., Article I., of the by-laws of the Council was amended so as to read as follows:

The Committee on Finance shall consist of three members. They shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

Two bills from members of the Committee on Membership, 1880-1881, amounting to $9.75 and $2.75, were ordered to be paid.

The engagement of the stenographer of the present meeting, Dr. Cyrus Morgan, at a compensation of $100, was approved.

Amendments to Chapter VIII., Articles IV. and VI, of the by-laws of the Association, were offered by Mr. Sheppard, and ordered to be reported to the Association.

It was ordered that any expenses incurred in carrying out the invitation to Professor Dr. Carpenter be paid.

The Committee on the Centennial Fund reported, that no application for grants had been received during the meeting at Niagara Falls.

Three applications for membership had been received, and, after examination, were ordered to be reported to the Association.

The amendments to the by laws, which have to lie over to a subsequent session, are as follows:

Add to Chapter VIII., Article IV., the following: If the name of a member be dropped from the roll for non-payment of dues, the name of said member may be added again to the roll by the Permanent Secretary, on notification by the Treasurer that his dues had been paid for the three years during which his name remained on the roll.

Add to Chapter VIII., Article VI., the following: Provided that the provisions of this article shall not be so construed as to reinstate any member whose name may have been dropped from the roll for non-payment of dues; nor shall any one, who has been expelled from the Association, be received as a delegate.

The President stated that the chairman of the Committee on Entertainment was desirous that another member from Washington be placed on that committee, and on motion of Mr. Llewellyn, the Chair was requested to appoint an additional member on that committee. The President designated William S. Thompson, of Washington, D. C., for that duty.

The Nominating Committee proposed Charles Becker, of Washington, for Local Secretary for the ensuing year, and he was duly elected to that position.

Mr. Remington.—Most of us saw last evening that the practice of giving banquets in this Association is one which is not a desirable feature of entertainment. We have had two experiences now,—one in Saratoga, and one at this place. Many of us are, doubtless, acquainted with the fact, that last evening a number of members from other houses, who have paid their share towards the entertainment of the Association, were not permitted to enter the banquet-room by the employés of this house. That is not the first time that has occurred, and I think the time has come for us to give up banquets as a method of entertainment. We get together and have our speeches. If it is desirable to have our supper and dinner pushed along in the way in which it has been customary to do so, it seems to me we are getting into the custom of calling that a banquet. I move that the Committee on Entertainment be requested to hereafter provide for no banquet, but to give us entertainment in some other form.

This resolution was seconded by several members, and the question was called for.

MR. SHEPPARD.—I should vote "aye" on that, if I had not had a long talk with the Chairman on the Committee on Entertainment this morning. He is most decidedly opposed to it.

The motion of Mr. Remington was adopted.

Mr. Kelley presented the following communication, which was read by the Secretary:

PENNSYLVANIA PHARMACEUTICAL ASSOCIATION

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION: The following resolutions were unanimously adopted by the Pennsylvania Pharmaceutical Association at its fifth annual meeting, held in Altoona, June 13th and 14th, 1882.

"WHEREAS, The copyrighting of common pharmaceutical names, by registering them as trademarks, is one of the latest developments of quackery, it is hereby

"*Resolved*, That this Association, in the true interests of pharmacy, protests against the injustice of allowing any such copyright; and it is also

"*Resolved*, That a circular, signed by the President and Secretary of this Association, be sent to each county medical society in this State, asking their aid to check the evil, by requesting their members to avoid prescribing such copyrighted articles.

"*Resolved*, That the delegates of this Association be instructed to bring this subject to the attention of the American Pharmaceutical Association, and the various State pharmaceutical associations to which they may be accredited."

Trusting that we may have your sympathy and active aid in crushing out an evil, which, if left alone, will soon become a serious detriment to the independent prosecution of our business, we are

Sincerely yours,

ALONZO ROBBINS,
President.
J. A. MILLER,
Secretary.

THE SECRETARY.—I move that this communication be received and placed upon our minutes. I do not think any other action is necessary on the part of our Association, since this Association for the last thirty years, from the time it was organized, has taken a decided stand against all such quackery

The motion was seconded and adopted.

Mr. Remington read a volunteer paper by Professor William T. Wenzell, of San Francisco, on the "Preparation of Phosphoric Acid" (see page 556), which was accepted and referred for publication.

Mr. Markoe.—The process proposed by the gentleman is quite correct in theory. I know from experiments that I made in a similar direction that it is possible; but it will be exceedingly slow. I do not think any one who has any facilities for making phosphoric acid by the old method will make it in that way, being available only for making small quantities. There is one point I would like to bring up now. As you all know, I proposed a number of years ago, a process which has been used quite extensively, and which I have continued to use, not only on the Pharmacopœia scale, but safely, also, on a working scale, usually amounting to fifteen or twenty pounds of phosphorus. Of course, in working these large quantities, I take every precaution to insure safety, the only departure from what I originally proposed for small amounts being to feed the strong nitric acid continuously in drops, so as to maintain the strength about the same. Some feed it in the first part of the process, say twenty, twenty-five, or thirty drops a minute; and then it thoroughly prevents the accumulation of nitric acid in the receiver, and the reaction is kept very uniform and even. One other point: I think one of the most troublesome things in the manufacture of phosphoric acid, and one that bothers pharmacists, is the evaporation to get rid of the excess of nitric acid. The intelligent use of some reducing agent is a very good plan indeed. My friend, Professor Lloyd, has used alcohol. I do not like that, as the organic matter in the alcohol is almost always carbonized, and we get a dark-colored liquid, and have to use animal charcoal to decolorize it. I think that the use of a pure oxalic acid is very satisfactory. If the phosphorus has been thoroughly oxidized, and the evaporation continued, until the liquid has reached the temperature of about 250 degrees, then it will have become very concentrated, and the addition of small quantities of oxalic acid will completely strip the solution of every particle of nitric acid. Add the oxalic acid at that temperature, carry it up to 300 degrees, and every particle of the oxalic acid is split up into carbonic dioxide and carbonic monoxide. A treatment by which we may know when the nitric acid is all out, is the one suggested by the gentleman. As long as there is nitric acid present, the reserved portion will flow upon the surface of the liquid in the dish and produce a dark-red color. When the surface becomes covered with pure white bubbles, it is the end of the reaction. Now I approve of this, because the use of oxalic acid might lead to danger in the hands of careless operators. But I do not think there is any danger in that operation; if the temperature is carried to 300° F., the oxalic acid will completely split up. Some have added a little sulphuric acid. That shortens the process very much indeed; it enables us to get rid of the nitric acid without carrying the concentration to a degree that can be reached where it would attack the enamel of the vessels. I have found it excessively difficult to get rid of nitric acid without carrying the temperature up to 400 or 475 degrees. At that temperature the concentrated phosphoric acid will dissolve even the hardest dishes with the greatest ease.

Mr. Lloyd.—We are very glad to hear Professor Markoe's remarks about phosphoric acid. I have used the alcohol process for some years to get rid of the excess of nitric acid, but I have found the trouble that Professor Markoe has pointed out, and which I believe I have mentioned before, that the organic matter would become carbonized, and I would have to use animal charcoal, or allow it to stand a great length of time to settle. But to get over this difficulty, I have made it a rule to previously distil my alcohol. Even then you will find the phosphoric acid will have a tinge of yellow and will have to be passed through animal charcoal.

Mr. Markoe.—I might say one word more now. We are working large quantities as a matter of economy. Some cheaper reducing agent might be used. I frequently use it, such as powdered starch or sugar. The trouble in that case is, that the moment you get an excess of these reducing agents then you get carbonization, and it is very difficult to get clean perfectly white acid without using oxalic acid; but this need not be used except to get rid of the last traces of nitric acid, and then the quantity is so small that there is no difficulty.

THE SECRETARY.—Professor Wenzell has correctly stated the fact that the process is not a new one. I believe it is the oldest one for the preparation of phosphoric acid; and an acid liquid obtained simply by exposing phosphorus to moist air was formerly largely employed medicinally, under the name of acidum phosphaticum—not phosphoricum, but phosphaticum. The liquid, as long as it contains phosphorous acid, of course acts as a reducing agent. I would suggest to Mr. Markoe the use of such an arrangement as proposed by Mr. Wenzell for the very purpose of cheapening the preparation.

MR. MARKOE.—For phosphorous acid?

PROFESSOR MAISCH.—The acid obtained by exposing phosphorus to moist air consists chiefly of phosphorous acid. I have made a good deal of it many years ago. We used to keep the phosphorus in a funnel, loosely covered with a glass plate, and place the whole in a vessel containing water, so the water reached up to near the phosphorus, or so that the phosphorus was partly covered by it. In this way it is gradually oxidized and at once dissolved in the water. The water contains then chiefly phosphorous acid until the phosphorus has disappeared, when on exposing it to the air, it is gradually converted into phosphoric acid. This is the acidum phosphaticum of the olden time.

MR. MARKOE.—I am very glad that Professor Maisch has brought that up, because I practically do use essentially the same thing in the manufacture of phosphoric acid. When working on a large scale, economy of nitric acid of course is a great point. Still I have not published the details of my process for the use of pharmacists, since with them such rigid economy is of no consequence. But when it becomes a matter of one hundred pounds at once, every pound saved will be that much accomplished towards the net profit. Therefore for the last year I have modified my apparatus in that respect, and instead of working with an excess of nitric acid, I work with an excess of phosphorus, and the consequence is that the nitric acid becomes quite weak. Towards the end of the process there is formed a good deal of phosphorous acid—so much that I have had to add nitric acid and oxidize. Without any evaporation in that way, I have carried the economy in the use of nitric acid very far. There is one other very interesting point—interesting to those who manufacture largely—that is, they work with very large vessels, relatively. In the manufacturing way I operate in this manner: 10 pounds of phosphorus, 10 pounds of water, 10 pounds of nitric acid, specific gravity, 1.38, 200 grains of iodine, and 200 grains bromine, are put into a 25 gallon stone-ware vessel, having a cover, which is made gas-tight with linseed meal lute. A large glass funnel is inserted into a tubulus in the cover of the pot, and then filled with pieces of pumice-stone. Nitric acid is then allowed to fall upon the pumice-stone at the rate of twenty to forty drops a minute, until forty pounds have been added. This gives an excess of phosphorus, and results in the formation of large quantities of phosphorous acid. The NO formed by the reduction of the nitric acid in the presence of the air, takes O, and becomes NO_2, which is absorbed by the nitric acid and the pumice-stone and washed into the generator, where the NO_2 is reduced to NO by the phosphorus, thus economizing the amount of nitric acid used. During the evaporation the excess of nitric acid is almost entirely gotten rid of by being reduced to NO by the phosphorous acid, which is oxidized into phosphoric acid at its expense. To get the best results, the process should be allowed to go on for a week or two after all the nitric acid has been added. The bromine can be added most conveniently by making a solution of it in diluted hydrobromic acid. It is necessary to add from time to time small portions of bromine, to make good the loss that occurs by its being constantly carried off by gases given off in the process. The quantity used need not exceed two ounces for the entire charge. It must be borne in mind that the contents of the generator should not be allowed to exceed the temperature of 100° F.

Mr. Allaire read an interesting paper on the Purity of Powdered Drugs, in answer to query 19 (see page 574), which was referred, and on motion of Mr. Sheppard, a vote of thanks was specially tendered to Mr. Allaire for his valuable contribution.

Mr. Lloyd—Mr. Allaire referred to one point in his paper that might be of interest to some of us, and which I have some doubt as to whether it can go in our Proceedings,—the fact that we have drug mills and that pharmacists can send parcels to them and have them powdered with the utmost confidence. This is true of Cincinnati. I would like to name one mill in Cincinnati, the business of which is to powder drugs, and which I have known for many years, of which I can say that every article that goes in the mill comes out without being tampered with. The owner is not a pharmacist, but he works for the benefit of pharmacists. Here, if it is proper, I would make that announcement.

Mr. Maisch.—The same can be said of Philadelphia. We certainly have one or more mills there which will powder even a small quantity with perfect reliance. Perfect confidence can be placed in the owners. But I rise more particularly at this time to state how highly I appreciate that labor done by Mr. Allaire; and while I appreciate it so highly I cannot help but ask the question, is the state of affairs at the present day any worse than it was thirty or forty years ago? Mr. President, I say "No." I know there was a time when it could be stated in foreign journals that an adulterated article was prepared for the American market. Gentlemen, if you will go abroad now you will hear that the best of drugs are scarcely good enough for the American market. I know, full well, if one wants to get an adulterated, or rather a cheap article, he can be accommodated. He can be accommodated in this country; he can be accommodated on the other side of the Niagara River, and he can be accommodated, also, perhaps, better in Europe than he can in this country. I know that factories are in existence there where they openly manufacture adulterated articles. Everybody knows it, and everybody knows that articles that are sold below their true value are adulterated. Now, to show an instance of the experience in this country, I may state that I know a gentleman, well qualified for the work, was engaged by a certain board of health for the examination of drugs, and nearly every one of those drugs in substance and powder proved to be of fair and even of good quality. That gentleman received a notification from the President or Secretary, I do not know which, but from some officer of the board of health, saying you must try to find some adulterated articles. The examiner had nothing whatever to do with the purchasing or collecting of these articles. The articles were collected from different parts of the State and sent to him.

There is another side of the same question which must not be overlooked, and that is this: I have listened here to statements—and I frequently find such statements—that, for instance, laudanum or opium contains a certain amount of morphine—not as much as it should contain; that Peruvian bark contains only a certain amount of quinine—less than it should contain, etc. Now, gentlemen, I think I have done a little in analysis, and, while I believe I am perfectly capable of analyzing such things for my own satisfaction, I question whether I have got so far as to state the results of my analyses to be so reliable that I would publish them to the world. I know the difficulties of such work that have been experienced by men, and if Professor Prescott should be in the room I think he will bear me out when I say the assay of such articles requires a great deal of experience in a particular line. I usually take with a great deal of allowance statements that are made in many of the journals in regard to the amount of alkaloids contained in such drugs, even with regard to a number of papers that I have published in the "American Journal of Pharmacy." I believe that in most of these cases the gentlemen are perfectly honest. They mean to do their best. They have very likely done their best, but the question is whether the work is as accurate as it could have been done. Dr. Squibb has analyzed a very large number for his own use,—not for any association,—and he hesitates to make such results public, as if they should be considered absolutely accurate; but, for his own satisfaction, he analyzes, and that is about as much as a good many can do.

MR. RICHARDSON.—While I have listened with great pleasure to the paper read by Mr. Allaire, it might be well for this Association to hear some of the views from the standpoint of some of the wholesale druggists. I mentioned the other day that your Association and the Western Wholesale Druggists' Association were in the same field; generally in separate paths, but in certain parts of that field they work together. Now the matter of adulterated goods is one that has been seriously considered by our Association. With some retail druggists it has been a source of bitter annoyance. You will meet with an intelligent class of dealers credited with a desire to do an honest business, but in the matter of such goods it has baffled them up to this time. One of the hopes of the Wholesale Druggists' Association is to eliminate from the trade such goods as are a disgrace not only to the wholesale trade, but to the retailers and to the final consumer.

Mankind, as you are aware, is periodically moved—I might say like a flock of sheep, all in one direction. The tendency for the last ten years has been in the departments of the wholesale business to see how near to nothing goods could be sold. You will all testify to this. The whole tendency of the trade throughout this country during the last ten years has been to see if goods could not be sold without cost. It has been a strife between all dealers to see which would come to a percentage which may be represented by nought. The whole tendency, like the stream of Niagara over this precipice, has been in that direction. It has gone so far that there are goods sold this day which are utterly worthless. The results of their being dispensed can scarcely be calculated, and it is worthy of the time of intelligent, educated pharmacists to devote their best energies to the suppression of such a nefarious practice, and it is here and for this purpose that the Western Wholesale Druggists' Association have sent a committee to you to co-operate with you and to ask your co-operation with us. That is the only purpose of our being here, and I trust that the united efforts of your Association, combined with that of the wholesalers who desire to make the business respectable in all its branches, will be effectually used after this in making known that hereafter no spurious goods shall be vended, no valuable lives placed at jeopardy by dispensing goods which can produce nothing but distressing results, and I trust, in saying these few words, I shall convey to you a sincere desire to co-operate with the wholesalers, through whom, as you know, a large portion of these goods are first placed on the market. The retail dealer dispenses them in a smaller proportion, as you very well know, directly from the manufacturer. This tendency which I spoke of a moment ago has been among wholesalers when they were engaged in selling goods at low prices. At the same time they want to buy them at a price on which they can make a profit. The whole tendency has been, for the last ten years, not only to sell goods cheap, but to sell cheap and worthless goods; but if you will give your attention to some extent to that matter, to correct that tendency, to turn the animus of business into its proper channels, its proper direction, you will do good service. We contend that any man who purchases goods,—purchases good ones,—when he sells them at his store is entitled—yes, entitled fairly—to a just and honorable compensation in the way of profit for doing the business, and no buyer who understands his business will ask an intelligent dealer to give him goods at prices which he knows he cannot pay for goods that are honest and fair. (Applause.)

Vice-President Ingalls took the chair, and Mr. Saunders read a volunteer paper, by Mr. Edmund Dana, Jr., on "Boracic Acid, its Preparations and Uses" (see page 553), which was accepted, and referred for publication. At this point the Secretary referred to a specimen of boro-glyceride upon the table, which had been prepared by Mr. McElhenie.

Mr. Sloan.—I think the author of the paper is mistaken with regard to any irritation being produced by small particles of boracic acid. We have a surgeon who used it very largely. I powdered it for him, to the best of my ability, in a mortar, two or three pounds at a time, which he used by dusting through an ordinary box-sieve right on the raw surface. He says it has no irritating properties at all. This boro-glyceride I have had occasion, also, to make for the same party, and he is very much pleased with it. The gentleman has quite an extensive surgical practice, and gives it in ten per cent. solutions, which he uses for injections and for application to ulcerated surfaces with very marked success.

Mr. Saunders.—I agree with what Mr. Sloan has stated. It is largely used in our country, and we used formerly the boracic acid with suitable unguents. I have never heard of any bad results or irritation from its use.

Mr. Remington.—With regard to this subject, I would like to say there have been several instances of poisoning reported in medical journals from the use of boric acid. I say boric acid, because the new Pharmacopœia has adopted this term. Boracic acid, as it is called, is not an acid of borax; it is derived from boron, hence it should be called boric acid. A point I wanted to make was the dangerous effects from the use of boric acid that have been reported, and have resulted from the practice mentioned by Mr. Sloan of dusting the powdered acid on the abraded surface, where the cuticle has been removed. The instances that have been recorded have been from poison taken into the system through the abraded surface. It would be well for anyone who has the opportunity to look into the subject, as it is a very important one, to discover under what circumstances it is poison.

Mr. Rosenwasser —Boracic acid, in certain conditions, is of great value. I think, as the Professor says, in case it is not dissolved it is poisonous, but in solution there is no danger from it, the same as from carbolic acid in solution.

Mr. Maisch.—In the case of boracic acid it would certainly be well worth while to investigate whether it was contaminated with other mineral acids or with acid salts, which are produced during its preparation.

Mr. Markoe.—I think that Professor Maisch has hit the nail on the head; because boracic acid, in the market, is frequently contaminated with sulphuric or hydrochloric acid as an incident in the process. Unless the acid has been carefully manufactured it will take but very little sulphuric acid to start up a bad irritation.

The question was asked whether the process for manufacturing boro-glyceride was not patented.

Mr. Maisch.—It is a fact; a patent has been taken out in Europe and, I believe, in this country, but I have been informed that no advantage would be taken of pharmacists in this respect, and that the patent was only taken out for the purpose of making this boro-glyceride for the preservation of meats and such substances, and not for pharmaceutical purposes. That is the information I have received.

Mr. Kennedy.—In my section boracic acid is used largely by eminent oculists in treating eye diseases, with very good results. I have heard of no complaints as to its producing irritation. It is used in a proportion of 10 or 15 grains to an ounce of water, a few drops of that solution being used several times daily. Occasionally I have had to powder some boracic acid, and have found a great deal of difficulty in powdering it. If any of the members know of a good way of powdering it I certainly would like to know how to do it; we have found, sir, that it takes a long time to powder a small quantity of it.

Mr. Maisch.—Has Mr. Kennedy ever tried to make a saturated hot solution, and to granulate it? You will find it to be more easily rubbed into powder.

Mr. Sloan.—The best results I have reached have been with the use of alcohol, making it slightly damp with alcohol and allowing it to dry spontaneously afterwards. It is not exactly all that could be desired, but it is the best process I have been able to arrive at yet.

Mr. Cool.—I agree with Mr. Kennedy in his remarks with regard to treating eyes. Our oculists are using it largely, and have done so for some time. I have never heard of any bad results from its use in very serious cases of ophthalmia.

Dr. Squibb.—Careful manufacturers use the precaution, in the preparation of their boracic acid, of having it recrystallized twice.

Mr. Eliel.—Boracic acid has been used in various forms—in the form of solution and as a mechanical mixture—for a number of years. It has been used in the form of dust and also as an ointment for dressing wounds. As far as I can remember I never heard of any difficulty in its use.

Mr. Bedford read a paper by Adam Conrath, on the "Alcoholic Strength of Commercial Fluid Extracts" (see page 545), in answer to query 21. The paper was referred to the Committee on Publication.

At this point President Heinitsh took the chair.

A volunteer paper by Mr. Lloyd, entitled "Precipitates in Fluid Extracts," was read by Mr. Remington (see page 509), Mr. Lloyd at the same time exhibiting a diagram in illustration of the subject. The paper was, on motion, referred for publication.

Mr. Remington.—Mr. President, I feel as if papers of this kind were the most desirable of any in the meetings of our Association. The study of the subject of percolation I consider has done more to elevate the science of pharmacy in the United States than any one cause. When we look to the continent of Europe and to England, or any other country where it has not received the same attention that it has in this country, we will almost always find that the process of maceration which involves comparatively little study, is in vogue. On the whole, we will see that the fluid extracts are now the most important class of liquid preparations that are used. When we look at the valuable studies of percolation, and the labor which has been bestowed by such men as Procter and Grahame, and probably, more than either of these gentlemen, Dr. Squibb, of Brooklyn, in pharmacy, the first place should be given to the subject of percolation, or, at least, as prominent as any. I very much appreciate these studies. I did not see this paper, but I knew that it was coming, and I am sorry that the author thought of depriving this Association of the pleasure of hearing it, by having it referred without reading.

Mr. Lloyd.—I would like to say a word with regard to the experiment described in the paper, that the bottle was stopped with a glass stopper, so that there could be no evaporation. I believe that I stated that in the paper.

Mr. Markoe.—I am very glad that the study of the process of percolation has been brought before the American Pharmaceutical Association at the present meeting. There seems to be an immense amount of pressure brought upon the pharmacists to depart from the well-tried and well-demonstrated process for apparatus which are said to be newer and better. Those who have studied percolation critically for years, are not satisfied, if I am not very much mistaken, because the subject has been laboriously reached by long experiments. Yet I think it would be well if the chairman of the Committee on Queries would introduce a query for next year, asking some member, who has the time and talent and experience, to give, merely in a plain way, the results of parallel experiments in the manufacture of the same preparations by percolation, direct, or with the officinal method, and by percolation under pressure. My own conviction is, but I do not want to open the subject at large, that there is nothing gained, practically, by percolation under pressure, that is, by means of a complicated apparatus. I hope a few well-directed experiments will be made along the very ground which has been gone over, so as to settle the question and offset the amount of pressure that has been brought to bear. The subject is saddled by an immense amount of theory, when there is very little given in the way of direct operative experiment.

The President.—I take the opportunity of expressing to Professor Lloyd, not only my thanks, but the thanks of the Association, for your very able paper.

Mr. Remington.—Subjects of this kind are, I believe, of great value; I should like to see more written upon them.

Mr. Remington offered the following resolutions, which were adopted.

Resolved, That the thanks of this Association are hereby tendered to the Entertainment Committee and the Local Secretary of this Association, for their very earnest and self-sacrificing efforts in our behalf; and that this Association hereby expresses its unqualified approval of the general plan of the entertainment inaugurated for the first time at this meeting.

Resolved, That the thanks of this Association be extended to the members of the press for their reports of this meeting.

Mr. Menninger offered resolutions in regard to hospital stewards of the army and navy.

Mr. Menninger.—I desire to offer a resolution, and to preface it by a few remarks. If I am not mistaken, it is upon a subject which this Association has taken action, or attempted to take action upon at a previous meeting, but without any success or favorable result; it is the subject of the pharmaceutical profession, and its standing in our national service, the army and navy. It is humiliating to every pharmacist who is in the service, and especially humiliating to us members of the Association, who are endeavoring to raise the standard of pharmacy in this country, that any sergeant in the army or navy, or any boatswain in the navy, can order a hospital steward about as if he were a common soldier, or a sailor before the mast. It is humiliating; it is a wrong to the public service: it is an insult to the whole profession. It is a wrong to the men who trust their lives to the care of the physicians and stewards of the army and navy. If they have the best talent in the medical profession, it is only by accident once in awhile that an able man gets into the apothecaries department. It is humiliating, and it is a national wrong. I may state in this connection, to those of you who are not aware of it, that our navy has not surgeons enough, and that there is a grade in our navy of steward in charge. That steward in charge, when the captain or commander is sick, prescribes for him; and he also prescribes for everybody on the vessel. He is a physician, surgeon, apothecary, medical attendant, nurse, and everything, and ranks lower than a coxswain or boatswain on that vessel. I have prepared this resolution, and I will state in this connection, that last winter a bill was introduced into Congress, at the instigation of a gentleman, now the apothecary of the Brooklyn Navy Yard, and who is a member of this Association; it had the favorable report from the Naval Committee of the House of Representatives, but the bill was laid to sleep in the pigeon-hole of the Senate.

Resolved, That this Association deems it of importance to the efficiency of the national military and naval organization, as well as due to the national reputation, that none but well-qualified persons, either graduates in pharmacy or licentiates in pharmacy, should be employed as hospital stewards or apothecaries in the public service.

Resolved, That in the opinion of this Association, such professional men should be raised to a rank commensurate to the qualifications requisite for such a service, and that for the purpose of obtaining efficient services, and in recognition of a learned profession, such officers should hold rank as commissioned officers.

Resolved, That the Committee on Legislation be, and it is hereby instructed, to forward copies of these resolutions to the Hon. Secretaries of the army and of the navy, to the surgeons-general of the army and navy, and to the chairman of the Army and Navy Committees of the United States Senate and House of Representatives.

The President.—Dr. Menninger's motion has been seconded; any remarks thereon will now be in order.

Mr. Maisch.—I am sorry that nobody seems inclined to speak on that subject, because I think it is a very important one. I have heard my own voice so often, that I was reluctant to get up. It is not more than proper to ascertain in what position apothecaries are in the army and navy of other countries. In the service of the Prussian army, and of the German army, apothecaries have a certain position; no one is accepted as an apothecary unless he has passed the regular state's examination, which entitles him to carry on the apothecary business. He has, I believe, the rank of lieutenant, messes, and is always classed with the commissioned officers. In the French army is found the most perfect organization of the pharmaceutical service; the lowest rank, I think, is that of lieutenant, and the pharmacist can gradually rise to a position with the rank and pay of general, just the same as in any other branches of the service. The relation of the apothecary in the navies of the two countries is very similar; they are commissioned officers, or have, at least, a rank of commissioned officers. I believe, in the German navy, there is no prospect of promotion for pharmacists, since in the German army there is no such advancement as in the French service; but the position of field apothecary is far superior to that of the hospital stewards.

MR. KENNEDY.—I am very glad that the resolution has been presented. I hope that it will do some good. I know from experience, having served three years during the late war, what the duties of hospital stewards are. I served as sergeant and subsequently as hospital steward. The effort was put forth then by hospital stewards and their friends to rank them as commissioned officers, of the grade of second lieutenants, but they received very little support and failed. There was then a class of men who were not druggists at all, but they called themselves druggists, who filled the positions, who knew nothing, comparatively, about the drug business. A man who got on the detached service as warden or nurse, and so on, through friends, would receive the appointment as hospital steward of the second class, which paid them at that time $25 per month. First-class hospital stewards received $32. I had only taken, at that time, my first course in the Philadelphia College of Pharmacy, and knew not so much about chemistry as I knew afterwards; and to show how little some of these men knew, I will speak of the hospital steward in charge of the hospital. He did not even know the action which takes place between chlorate of potash and sulphur. I wrote a prescription and he rubbed the two articles up in a mortar. The result was the loss of the mortar and pestle and a slight injury to himself. I wrote a prescription for powdered potassium, and he did not know what it was. The army at that time was filled with this kind of men. Now the resolution is offered for the consideration of the Committee on Legislation, and of course it will require work. I don't know that they will succeed in raising the rank of hospital steward to that of a commissioned officer, but it will be well to try.

MR. MARKOE.—I think the army should have a class of stewards equal in education to that called for in the medical profession, and the examinations should be just as particular. It occurred to me that in order to reach it by legislation, it would be better for us to suggest to local associations to request their representatives and others in their interests to further this legislation. I think that that is the easiest way to reach it, because the members of the local associations meet, many of them, much more frequently than we do, and the members know and come in direct contact with their representatives. When we want to get anything through in Boston, we generally invite three or four representatives and give them a good dinner, and we find it almost always has some effect.

MR. MENNINGER.—I am very glad that Mr. Markoe has called attention to the importance of reaching the representatives. I have had a little experience with politicians myself. My opinion is that a great deal can be done by members individually. In many districts a candidate for Congress comes in early in the morning for a glass of Vichy water, and many Congressmen are addicted to drinking a great deal of water in the morning. I think that that would be a good time for the apothecary to strike the iron while hot. He might interview him on this question of stewards in the army and navy and commit him now—now is the time. But depend upon it, you cannot do a great deal afterwards in that way. I think the true method is to work through the members of the local associations. I am very sorry that my friend, Mr. Kennedy, to use a slang phrase, sought for promotion by endeavoring to kill his superior officer by getting him to rub up chlorate of potash with sulphur. That is something I should never have suspected of him.

Mr. Lemberger.—I suggest that it would be better to take the Congressman after he has been elected. He will be sure to promise you anything before he is elected.

Mr. Menninger.—You might take him at both times. You can get better promises before he is elected than afterwards.

The resolutions offered by Mr. Menninger were adopted.

Mr. Bedford.—I rise, fellow-members, to say a few words regarding the death of one of our former Presidents, Henry T. Kiersted, of New York city, who died yesterday. He was one of the oldest living druggists in our country, being in his ninetieth year. I have seen him frequently for the last two years when he was so much an invalid as to be carried from room to room. His record as a druggist is one that is honorable. In his early boyhood, when it was hardly supposed that he could stand any rugged work, he undertook the drug business, and as my informant tells me, in the year 1814 entered a drug store in the city of New York, and from that time until the time of his death his record is one of honor. During this time he held many offices of public honor and public trust, for he was at one time the Collector of Taxes in New York, and held several financial positions of great responsibility. He was elected President of this Association in the year 1860, when we met in the city of New York, and owing to the fact that no meeting was held in 1861, he held the office for two years. Although retired from business for some years past he has always held a high regard for this Association, and when calling on him, before I came away, he said, "Come again, if you can, before you go to Niagara, and if any of my friends inquire after me, tell them that I often think of them.' His funeral services occurred to-day.

Mr. Menninger.—I desire to say just one word on this subject, and it is only probably embodying admonition and a lesson which we may derive from such a useful life as that which our Ex-President, Henry T. Kiersted, has led. I shall ever regard it as one of the greatest pleasures of my life to have known an old man with the manly vigor and of the type of Mr. Kiersted. He took a lively interest up to the very last moment in pharmaceutical matters. At the age of eighty he wrote me a vigorous letter, commending the work being done in the New York College of Pharmacy, and asking, as a privilege, that he be sent the questions that were annually put to the students. In his eightieth year he had a vigor and a devotion to the profession that stand as a noble example to the rising generation.

At the request of Mr. Seabury, Mr. Remington moved a reconsideration of the resolution by which the Entertaiment Committee was requested to provide hereafter no banquet. The motion was agreed to.

Mr. Seabury.—Mr. President and fellow-members, I can easily see the objective point the meeting had in putting themselves on record not to have a banquet, and yet at the same time if properly managed at our next meeting, and we have our present experience of the last few years to assist us, we may find some new avenue out of this difficulty. I think it can take place perhaps under a different name, or under a different method of arrangement; but in my opinion a banquet, whether we call it by that or any other name, is one of the most important features of a meeting of this kind. Every association expects it, and every association has it. It stimulates a great many members to be present. It was one of the attractions of our programme, in my opinion. But as it has been arranged for us both at Saratoga and Niagara, it does not meet with the approbation of the Entertainment Committee, and yet, at the same time, I would like the Association to give this committee discretion enough to use their own judgment as to whether they had better provide for a banquet at Washington or not.

I only say it because I believe that it is one of those events that at least fifty per cent. of our members look forward to, and if we fail to have a banquet it will be a great expense to the members to rent a hall for a dinner prepared there, and I don't think that our members are prepared to risk this. But if you will reserve that motion and leave it to the discretion and judgment of the committee, we will do our utmost to keep it within the sentiments of that resolution.

Mr. Menninger.—Mr. President, I hope the discretionary power asked by the committee will be granted to them. This committee has certainly shown an amount of energy and ability, and given an amount of labor which entitles them to confidence on the part of the Association. That our banquets previously given at hotels under the auspices of the Association, such as the one at Saratoga and the one last evening, were not successful was not due to our committee, but it was due to the mismanagement of the hotel-keepers. Our committee for the next year is the same as last year, and can bring the experience of last year to bear upon future operations. I will not comment upon the peculiar action of the proprietor of the hotel last evening, who placed us in an embarrassing position of having vacant chairs and then refusing admission to officers and members of this Association. Nor will I comment upon the fact that word was sent in to myself several times during the evening that "we must bring this thing to a close," "cut it short," "we want to fix the room," "we will turn the lights out," and such words as those. Certainly our Committee on Entertainment could not foresee that. However, they have been warned, and they can place safeguards in future by contracts in form, and penalties that will necessarily insure the object sought for. The committee certainly worked hard, and I think they ought to have the confidence of the Association.

Mr. Saunders.—I think that the thanks of the Association ought to be given to the committee who have worked so hard and so well for our pleasure; at the same time I think we have had a considerable amount of experience in regard to these banquets. I can say nothing about the banquet last night, as I was among the outsiders who did not succeed in getting in, but I remember with very lively recollections the Saratoga affair, which was very much of the same character, as I learned from those who were at the banquet last night; they are not, as a rule, very successful. While in Washington we might arrange to entertain the Association in some other way. We might have a reception, or something of that kind, call it by some other name, perhaps, where we can entertain the members. As it is we have been going from bad to worse for the last three years, and I do not think it has been very satisfactory, although not the slightest portion of this failure can be attributed to the Entertainment Committee.

Mr. Maisch.—Has the American Science Association a banquet?

Mr. Saunders.—No, sir.

Mr. Markoe.—Allusion has been made to the American Science Association. I merely wish to call the members attention to one peculiar feature of that association, which affords a great deal of entertainment and sport. That society is so large, and covers so many branches of science, that it is divided into nine sections, and all of these nine sections have simultaneous meetings. There is also usually a non-official section, which is called "Section Q," that is, a general meeting, devoted to the interests of the wits of the association, to which ladies are invited, and they devote their attention to making fun of all the sober work of the Association. Any kind of humorous matter and speeches are in order. I think that if we instituted a section "Q" as an auxiliary to this Association, we might get a great deal of fun out of it.

Mr. Remington.—That is my idea. It would be a step in the right direction, and there is no gentleman I know of in this Association that has the faculty of organizing section "Q" better than the chairman of the Entertainment Committee. Allow me, in introducing the resolution this morning to do away with banquets, to say that I thought I was doing that Entertainment Committee a great service. I thought they would be very glad indeed to be relieved of this thing. I feel certain that the sentiment of this Association is against banquets, pure and simple. I do not mean to say that we shall not have anything else; that is just the idea presented here that we have a meeting for fun; we have science in the morning, let us have fun at night, but do not let us have hotel banquets.

Mr. Menninger.—I do not see the question in that light at all—in the light which the gentleman who has spoken sees it. The chairman of the Entertainment Committee does not pledge himself, as I understand it, to give us a banquet, but he does not want his hands tied; I think we will show that confidence in him by not tying them. If he finds a section "Q" is desirable, I know that he knows his P's and Q's well enough to organize it, and I am satisfied that what he does not know is not worth speaking of.

Mr. Seabury.—Mr. President, if you will allow me just one minute more I would say that the reason that the committee asks for discretionary power is, because while we have been largely unsuccessful in our attempts at banqueting heretofore, it is no reason why it should continue so. I am absolutely satisfied that, with perhaps two more years, we can write such a beautiful prescription, that it will be taken with prodigality every time and everybody will be absolutely satisfied, but it requires watching. A great many things occur which will benefit the Association, and when we meet at Washington we cannot make the same mistake twice, as our good friend says wisely, "the first time it is your fault," but "the second time it is his." One difficulty which we have had to contend with here and elsewhere is, that it was attempted to put four hundred men and ladies into a space which can only be occupied by two hundred and fifty. That is one mistake, and that is one reason why this committee asks for discretion. Now, if in Washington we will get a room where all of us can meet and have a good dinner, I think we can arrange it; why we can have two dinners the same day without any difficulty. Let us pay for it. For instance, the hotelkeepers will say we will give you two dinners, provided you pay us seventy-five cents more on the supper than the usual charge would be; why, that will give you a banquet; seventy-five cents apiece for four-hundred people would be about $300, if my lead-pencil is correct. It is a very small item if we have a large attendance, but the committee will risk no such extravagance unless we are supported by our finances, not otherwise. One thing I ask this Association to do, and they must do it to this committee; it makes very little difference of whom it is composed, you have got to give them discretion. Because no two men can see this matter from the same standpoint—it is impossible. You would always have trouble. If you cannot trust them change them each year until you get the right kind of committee, but give them your confidence, or else they are not worth having.

Mr. Saunders.—I move that discretionary power be granted to the Entertainment Committee in this matter.

Mr. Remington.—I feel satisfied, Mr. President, with this understanding, that the Committee on Entertainment are well aware of the sentiment of the Association, and have the utmost confidence in them, that they will furnish an entertainment for our comfort and pleasure, something we want; that was the only object of introducing my resolution, and I am perfectly willing to withdraw it.

The motion of Mr. Saunders that the Entertainment Committee have discretionary power in regard to providing for a banquet, was seconded and agreed to.

At the request of Mr. Saunders, who was not present when the time of the next annual meeting was considered, Mr. Remington moved a reconsideration of this subject, and the motion was duly seconded and agreed to.

Mr. Saunders.—I move to amend that the time for the next meeting be fixed in the second week in September. I do so, because, meeting in Washington in the first week, we shall find it rather unpleasantly hot. Furthermore, I do not see any other good reason for changing the time of meeting. If it was possible we might meet a little earlier, that would suit some of the business men better. But we can all manage to get away the second week as well as the first. I think it would be more comfortable to meet the second week on account of the high temperature that occurs early in September and in the latter part of August.

Mr. Bullock.—The only object the committee had in view in meeting in the first week was the liability of our equinoctial storms at the latter end of the season. We thought by having it earlier in the season that we would escape that.

Mr. Remington.—I have been at a number of conventions in Washington, and I know that Washington is a pretty warm place; that if there is no good reason for fixing the meeting in the first week in September, I think it would be very pleasant to have it in the second week. Here we are in a much higher latitude than we will be in at Washington, and the second week in September is found to be very pleasant indeed. Looking at it from that point of view, it would not seem right to go to a more southern latitude,—a city which is known, ordinarily, to have much warm weather. The difference is not sufficient to affect business men's prospects, and I certainly feel very favorably disposed towards changing the time to the second week.

Mr. Baker.—I have had some experience, sir, with Washington in different seasons. I know something about the climate. At the same time Washington may be colder and have snow when there is rain North. But this varies very much Sometimes September is very hot and in other years it is cold. This year it is cool. I had a letter from my wife yesterday, in which she says it is positively cold, and she thinks I am freezing here. It is never very warm there. We have hot days but the nights are cool. I do not object to Washington on the score of that time.

Mr. Good.—I was very glad, indeed, to have Professor Bedford recommend that the Association change the time of the meeting to the last of August, and when his committee reported Washington, and the first Tuesday in September, I hailed it as a good sign. I only inferred that we did not reach the last week in August from the fact that Washington is comparatively a southern city. I shall be very sorry to see any backward steps in that direction. When we were in the Mississippi Valley we wanted the time of the meeting fixed a little earlier. We know the experience of last year at Kansas City. We regret it very much. The change was then unfortunate and disastrous. You could have met any time in August in the same region this year and have had a delightful temperature. I should like to see the time of the meeting left as it was fixed by the committee.

Mr. Menninger.—I hope the time of the meeting will not be changed. I regret very much, more than Mr. Saunders or Professor Remington, the change, and many of us will find it much more difficult and inconvenient to go the second Tuesday than the first Tuesday. The retail business springs up in September when the people return from the country. There are changes to be made very frequently about the stores, and it is more inconvenient for us to get away later in the season. If it is earlier, I think it is more convenient. It is also more convenient for those of us who are connected with the leading colleges of pharmacy. I do not know how it is with some of the other colleges, but in the New York College of Pharmacy we have our supplementary examination of juniors about the same time—about the second week in September.

Professor Remington.—Is not that the third week?

Mr. Menninger.—Is it the third week? Even at the third week we could hardly attend the meetings, and feel sure of being free to make the necessary arrangement. While we are considering about Washington, although if the weather is very hot, still the means for making yourselves comfortable are at hand in the many facilities and conveniencies of modern houses and modern civilization, which we did not have to quite that extent in Kansas City.

Mr. Bedford.—In making allusion in the annual address to this change to an earlier part of the season, I had in view what I know to be the desire of a very large number of our members, namely, that the month of September is an inconvenience, which prevents a great many from being present—we would have had a great many more at our meeting if it had been a month earlier. Now, there are some from the West who would be here; the wholesale men can come as well in September as August. The retail men, as alluded to in my address, and also by Mr. Menninger, have got to be back at their business, as it springs up about the 1st of September, and they can illy spare the time, and while we cannot commit ourselves to any definite time, I hope to see yet that the Association will come to the plan of having their meetings at some time between the 1st of June and the 15th of August.

Mr. Saunders.—I think with all due deference to the opinions that have been expressed, it must be conceded that the earlier in the season the hotter weather is likely to prevail, and I know from observation, extending over several years, that the earlier part of September, as a rule, is hotter than the latter part. I think by making it at the usual time, that we shall more probably have weather that will be pleasant. While we would like to consult the convenience of every one as far as possible, I think the comfort of the members at the time of the meetings is one great element in the enjoyment of the occasion. I cannot see that there have been any better reasons advanced for changing our usual time on this occasion than we have had before us on several previous years, when it was discussed very thoroughly. I suppose that it is very hard to meet the convenience of everybody. For one, I should like to meet with them at that time. We all remember our experience at Kansas City; we were sufferers when the temperature went up to 105° in the shade, and 105° at night, and we were obliged to go about with our coats off; I do not want to resort to that experiment in Washington. I would like to see the time fixed in the second week.

Mr. Sheppard.—I would like to inquire of Mr. Baker what is the likelihood of the temperature of Washington in August?

Mr. Baker.—I have not been there during August a great deal, but it is pretty hot there. We have hot days there when it is hot weather, but we have had rather cool weather this August, but it is an exceptional year.

Mr. Ingalls.—I was there last September and the year before that, and it was awfully hot, terribly hot.

Mr. Markoe.—Was it warm late in September?

Mr. Ingalls.—That was late in September.

Mr. Markoe.—I hope there will be no change, and that the second week will be the time for the meeting. We can fix the time in August when we desire to meet in some place where we are likely to have nice cool weather, but I think it will be found to be hot there in July and August, and we certainly know that when we go to a Southern city, that September will be better than August. At least that has been my experience.

Mr. Diehl.—The climate of Washington City is very much like the climate of Louisville in September, and it is quite warm in Louisville this year. We have had cool weather, but ordinarily it is quite warm. I think it is safe to go a little later in September, than earlier.

Mr. Bedford.—I would like to ask if you think that there is an average of 2° of difference between August and September.

Mr. Diehl.—I make no average, but this is simply the fact about it.

Mr. Bedford.—Is it not hotter in August in Washington than it is in September, as an average?

Mr. Diehl.—No, sir.

Mr. Bedford.—I say that we are just as likely to be as comfortable in August as in September.

Mr. Menninger.—I never could get the averages of the temperature, but permit me to say that 3° average difference in a month is a great difference.

The question being on the amendment of Mr. Saunders, to change the time of meeting recommended by the committee, to the second Tuesday in September, a division was called for, resulting in a vote of 24 ayes and 17 nays. The amendment was carried, and the resolution as amended, was likewise agreed to.

Mr. Bedford, on behalf of Mr. Lloyd, chairman, read the following report of the Committee on Papers and Queries.

Query 1.—Examine the sugar- and gelatin-coated Quinine pills of the market, and report on their quality as regards purity and proportion of Quinine.

Accepted by Virgil Coblentz.

2. It has been said that if snow, formed in any month but April, be melted and bottled, the water will become ropy. That snow which falls during the month of April, upon the contrary, will furnish water which will remain limpid the summer through, and which can be used by pharmacists and photographers. Experiments on this subject are desired.

Accepted by George W. Sloan, of Indianapolis.

3. What is the quality of commercial Oil of Lemon?

For general acceptance.

4. It has been said that Sulphate of Cinchonidine, containing a considerable proportion of Magnesium Sulphate, has been found on the market. Is this true as regards the salt made by any of our American manufacturers?

Accepted by George W. Kennedy, of Pottsville, Pa.

5. What is the Citrate of Caffeine of commerce in this country? Good authorities have stated that the German preparation is simply a mixture of Citric Acid and Caffeine.

Accepted by C. Gilbert Wheeler, of Chicago.

6. It has been asserted that some of the pills of the market are coated with mixtures of starch, terra alba, chalk, etc., although supposed to be coated with pure sugar. Is this true?

Accepted by Professor P. W. Bedford, New York City.

7. Examine and report upon the Tannates of Quinine of commerce.

Continued to Charles P. Hartwig, Chicago, Ill.

8. Are commercial Volatile Oils adulterated to any extent. What is generally used as the adulterant?

Continued to W. H. Crawford, St. Louis.

9. What is the alkaloidal strength of the Fluid Extract of Cinchona of the market, and how does it compare with the requirements of the Pharmacopœia?

Accepted by H. B. Parsons, N. Y.

10. Ethereal Oil of male fern deposits a sediment. Is the sediment or the overlying oil the desirable portion?

Continued to Charles P. Hartwig, Chicago.

11. What proportion of the Cinchona barks of commerce will answer the pharmacopœial tests? Give particulars.

Accepted by H. B. Parsons, of New York.

12. Are the compound Cathartic Pills of commerce prepared in accordance with the Pharmacopœia?

Accepted by S. Henry Stevens, Pittsburgh.

13. Lead plaster and other plasters of the United States Pharmacopœia get hard and brittle by keeping. How can their soft consistence, as when freshly made, be preserved?

Continued to Hugo W. C. Martin.

14. What is the quality of the Belladonna leaves of the market?

Accepted by Byron F. McIntyre, of New York.

15. It has been asserted that some pharmacists pay percentages to physicians who send prescriptions to their stores. Is this true to any great extent? What is the feeling of the pharmacists of our country regarding the matter, and the feeling of physicians?

Continued to Hugo W. C. Martin.

16. Will Iodide of Potassium, of foreign and of home manufacture, answer the tests of the Pharmacopœia? Which averages best?

Accepted by Professor A. B. Prescott, of Ann Arbor.

17. The alkaloid Berberine is, by some writers, claimed to be nearly insoluble, while others claim it is freely soluble in water. This discrepancy in statements should be investigated.

Accepted by O. Eberbach, Ann Arbor.

18. What is the chemical nature of the acrid principle of Mezereon bark?

Accepted by O. Eberbach, Ann Arbor.

19. Is Brucine poisonous? Dr. Garrod has stated that it is not.

Referred to Roberts Bartholomew, M.D., Philadelphia, Pa.

20. The bark of Rhamnus Purshiana contains a substance that is said to strike a red color with ammonia. What is this principle?

For general acceptance.

21. The Pharmacopœia recognizes three species of Buchu. Is there any difference in their medicinal action? Which is to be preferred?

Accepted by Professor P. W. Bedford, New York.

22. Does Fluid Extract of Ergot deteriorate by age?

For general acceptance.

23. Is the yellow principle of Berberis Aquifolium root identical with Berberine?

Continued to Professor F. B. Power, Philadelphia.

24. What is the nature of the crystalline precipitate which forms in tincture of Boletus Laricis?

Accepted by C. W. Phillips, Cincinnati.

25. What menstruum is best adapted to extract and hold in solution the desirable principles of Licorice root.

Continued to F. F. Prentice, Janesville, Wis.

26. Is it not desirable to have a Stathmetometric as well as Volumetric method inserted into the Pharmacopœia, thus doing away with the absolute need of measuring apparatus, which are dependent upon temperature?

Accepted by William W. Bartlett, Boston.

27. What is the best method of maintaining the proper temperature of a liquid in the course of examination?

For general acceptance.

28. What is the best practical method for the pharmacist to pursue in order to determine melting-points?

For general acceptance.

29. Is it desirable that pharmacists be held personally responsible for the quality of the goods which they dispense?

Accepted by Robert H. Cowdrey, Chicago.

30. What is the most desirable form of Pepsin for dispensing purposes?

For general acceptance.

31. What is the crystalline form of the white alkaloid of Hydrastis Canadensis (Hydrastine)? What is its formula?

Continued to Frederick B. Power, Philadelphia.

32. Does the Brucine of commerce contain Strychnine? An examination of the Brucine of commerce is desired.

Accepted by S. A. D. Sheppard, Boston.

33. It is said that the essential oil of Mustard Seed of the market consists of two kinds, one made of the seed, the other made artificially. Information is desired, with sketch of mode of manufacture.

For general acceptance.

34. Describe the structure of the different varieties, or species, of Senega of commerce. It is particularly desirable that a thorough microscopic examination be made of the roots of authentic specimens of Polygala Senega and its varieties, and of Polygala Boykinii.

Continued to E. B. Stuart, Peoria, Ill.

35. Good authority states that artificial Salicylic Acid is now used in making Oil of Wintergreen, and that this artificial oil is cheaper than the natural. To what extent is this true?

For general acceptance.

36. What is the present production of Bromine in this country?

Accepted by W. J. M. Gordon, Cincinnati, O.

37. To what extent does the Iodine supply depend on the supply of Kelp?

Accepted by Professor P. W. Bedford, New York.

38. Is there any difference in the laxative properties of Rhamnus Purshiana bark and the bark of Rhamnus Frangula?

Continued to Professor E. S. Wayne, Cincinnati.

39. What is the quality of the narcotic herbs of commerce?

Continued to C. S. Hallberg, Chicago.

40. What is the percentage of Hydroxide of Potassium in commercial white caustic potash?

Continued to Adolph G. Vogeler, Chicago.

41. Is Oil of Birch bark sold in commerce under the name Oil of Wintergreen?

Accepted by George W. Kennedy, Pottsville, Pa.

42. What is commercial musk?

For general acceptance.

43. Is the Sulphate of Quinine imported into this country and sold in bulk equal to that of our manufacturers?

For general acceptance.

44. It has been asserted that in percolating powdered drugs, the alcoholic menstruum increases in alcoholic strength, owing to absorption of water by the drug. Experiments are desired.

Accepted by J. U. Lloyd, Cincinnati.

45. Does Oil of Thyme, made years ago, contain a larger proportion of thymol than that of the present day?

Accepted by Professor Joseph P. Remington, Philadelphia.

46. What is the difference between white and red Oil of Thyme?

For general acceptance.

47. A good process for determining Tannic Acid.

For general acceptance.

48. What is the proportion of Caffeine in the powdered Guarana of commerce?

Accepted by J. H. Feemster, Cincinnati.

49. The source and supply of indigenous drugs.
Accepted by C. B. Allaire, Peoria, Ill.

50. What is commercial Oil of Cade?
For general acceptance.

Mr. Markoe read the following resolution, which was adopted:

Resolved, That the thanks of the Association be tendered to the past officers for the able manner in which they have severally discharged their duties.

The Committee on Exhibits made a verbal report, and, on motion, was granted one month's time to finish the full report for publication.

The Secretary then read the minutes of to-day's session, and they were approved.

Mr. Menninger moved that the Association now adjourn, to meet in Washington, D. C., on the second Tuesday of September next.

The President.—Before we adjourn I desire to express thanks to my associates for the marked kindness of bearing with me during our meeting. I think that this has been one of the best and one of the largest meetings we have ever attended, and that you will all say it was good for us to be here. Your officers have had from you nothing but a great deal of kindness, for which we are heartily thankful.

Mr. Menninger's motion was adopted, and the Association adjourned.

The following new members were elected by the Council, September 14th and 15th:

Illinois.

C. G. Wheeler, Chicago.

Kentucky.

Edward Charles Reiss, Covington.

Michigan.

George Gundrum, Ionia.

New Jersey.

William P. Loveland, Elizabeth.

New York.

Charles A. Drefs, Buffalo.
Oscar L. Harries, Buffalo.
Gustavus Michaelis, Albany.
Melvin Montgomery, Silver Creek.
Henry J. Penfold, Angola.
Willis S. Rich, Brooklyn.
Franklin B. Van Alstyne, Kinderhook.

North Carolina.

Bond E. Sedberry, Fayetteville.

Ohio.

William F. Spieth, Cleveland.

Pennsylvania.

Thomas Irvin Deibert, Pottsville.

The following delegates became members by signing the Constitution and By-Laws:

Leo Eliel, South Bend, Ind.
George A. Kelly, Pittsburgh, Pa.
Emmet Kannal, Rensselaer, Ind.
Herman J. Watjen, Vincennes, Ind.

John M. Maisch,
Permanent Secretary.

The Committee on Entertainment, who, at the request of the Council, had also charge of the travelling arrangements to and from the meeting, found it impossible to obtain a reduction of fare beyond the usual summer excursion rates to and from Niagara Falls. However a considerable number of the members residing east and south of the place of meeting met on the trains that reached Niagara Falls during Monday night and early on Tuesday, so that nearly the whole number of those present during the meeting participated in the opening exercises. During the greater portion of the four days concerts were given in Prospect Park and other places by Wahle's band, engaged by the Entertainment Committee, who had also arranged for a ladies' reunion in Prospect Park on Tuesday afternoon, and for a vocal concert on the same evening by the Buffalo Singing Society, the Niagara Falls Liedertafel, and several soloists. Wednesday afternoon was devoted to an excursion to the Whirlpool Rapids, the ladies being conveyed there in carriages, while the gentlemen travelled there by rail, and in the evening a grand ball was given for the enjoyment of those finding delight in dancing. Thursday afternoon was spent by most upon Goat Island, or in visiting other interesting and delightful spots in the vicinity, and in the evening a banquet took place, closing with brief speeches.

Most of the members, with their ladies, had been provided with accommodations at the Cataract House. The unpleasant experience which the committee had, and which to a certain extent marred the pleasure, has been stated to the Association (pp. 645, 662) and need not be again alluded to here.

Towards noon on Friday a goodly number of the members left for a trip across Lake Ontario, down the St. Lawrence River to Montreal or Quebec, and thence through the White Mountains and Franconia Mountains, and down the Hudson River to their homes. Others, while homeward bound, visited Watkin's Glen, Trenton Falls, Howe's Cave, and other places of interest, all delighted with their journeys. A few of the travellers only were compelled by the severe rainstorm, which occurred about a week after the meeting adjourned, to abandon a portion of their programmes, the large majority having reached their homes before the storm commenced.

JOHN M. MAISCH,
Permanent Secretary.

LIST OF COLLEGES AND ASSOCIATIONS

Having Accredited Delegates to the Thirtieth Annual Meeting, with the Addresses of their Presidents and Secretaries.

COLLEGES OF PHARMACY.

	President.	Secretary.
Chicago, . . .	N. Gray Bartlett.	J. S. Jacobus.
Cincinnati, .	H. F. Reum.	F. Schuerman.
Louisville, . .	V. Davis.	F. C. Miller.
Maryland, . .	Joseph Roberts.	John W. Geiger.
Masssachusetts,	B. F. Stacy.	William F. Sawyer.
National, Wash.,	W. G. Duckett.	Charles Becker.
New York, .	Ewen McIntyre.	M. L. M. Peixotto.
Ontario, . . .	William Saunders.	G. Hodgetts.
Philadelphia, .	Dillwyn Parrish.	William J. Jenks.
Pittsburgh, . .	George A. Kelly.	A. H. Wilson.
St. Louis, . .	W. H. Crawford.	E. P. Walsh.

STATE PHARMACEUTICAL ASSOCIATIONS.

	President.	Secretary.
Alabama, . .	P. C. Candidus, Mobile.	S. W. Gillespie, Birmingham.
Connecticut, .	Dwight Phelps, West Winsted.	Frederick Wilcox, Waterbury.
Georgia, . .	J. W. Rankin, Atlanta.	S. P. Shuptrine, Savannah.
Illinois, . . .	Henry Biroth, Chicago.	T. H. Patterson, Chicago.
Indiana, . .	G. W. Andrews, Muncie.	Joseph R. Perry, Indianapolis.
Iowa, . . .	A. R. Townsend, Boone.	E. L. Boerner, Iowa City.
Kansas, . . .	F. E. Holliday, Topeka.	G. A. Chapman, Atchison.
Kentucky, . .	G. A. Zwick, Covington.	Arthur J. Elwang, Louisville.
Massachusetts,	S. A. D. Sheppard, Boston.	J. W. Colcord, Lynn.
Missouri, . .	A. R. Edmonds, Miami.	W. T. Ford, Kansas City.
N. Hampshire,	C. A. Tufts, Dover.	George F. Underhill, Concord.
N. Jersey, . .	James B. Canby, Atlantic City.	A. P. Brown, Camden.
N. York, . .	A. B. Huested, Albany.	C. W. Holmes, Elmira.
North Carolina,	William Simpson, Raleigh.	James C. Munds, Wilmington.
Nova Scotia, .	Henry A. Taylor, Halifax.	James H. Angwin, Halifax.
Ohio, . . .	D. C. Peters, Zanesville.	L. C. Hopp, Cleveland.
Pennsylvania,	Alonzo Robbins, Philadelphia.	J. A. Miller, Harrisburg.
Quebec, Prov'e,	Alex. Manson, Montreal.	W. Ahern, Montreal.
Rhode Island,	Fred. Smith, Providence.	
South Carolina,	H. Baer, Charleston.	E. H. Kellers, Charleston.
Virginia, . .	T. R. Baker, Richmond.	Ed. R. Beckwith.
West Virginia,	E. L. Boggs, Charleston.	C. Moenkemoeller, Wheeling.
Wisconsin, . .	George Bauman, Oshkosh.	F. B. Heimstreet, Janesville.

LOCAL PHARMACEUTICAL ASSOCIATIONS.

	President.	Secretary.
Albany County, New York,	C. H. Gaus, Albany.	W. S. Elmendorf, A'by.
Cleveland, Ohio,		A. Mayell, Cleveland.
Erie County, New York,	J. Reiffenstahl, Buffalo.	H. P. Hayes, Buffalo.
German Apothecaries, New York,	P. F. Lehlbach.	L. G. W. Ruprecht.
Indianapolis, Indiana,		J. A. Lambert, Ind'ps.
Kings County, New York,		C. R. Paddock, Brook'n.
Lancaster County, Pennsylvania,	C. A. Heinitsh, Lancaster.	A. A. Hubley, Lancast'r.
Mobile County, Alabama,	John A. Soto, Mobile.	
Monroe County, New York,	G. H. Haass, Rochester.	C. H. Haskins, Rochst'r.
Newark, New Jersey,		W. M. Townley, New'k.
Richmond, Virginia,	Hugh Blair.	Joseph Anthony.
Toledo, Ohio,		F. T. Bower.

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	President.	Secretary.
Chicago,		Fred. M. Schmidt.
Cincinnati,	John H. Linneman.	William J. Martin.
Louisville,		A. J. Elwang.
Massachusetts,	William C. Durkee.	Charles C. Williams.
New York,	Thomas F. Main.	F. Hohenthal.
Philadelphia,	T. H. Potts.	William E. Krewson.
St. Louis,*	J. W. Tomfohrde.	G. H. M. Goehring.

LIST OF PUBLICATIONS RECEIVED

For the American Pharmaceutical Association.

Societies and editors are respectfully requested to forward all publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington.

JOHN M. MAISCH,
143 North Tenth Street, Philadelphia, Pa.

The Druggists' Circular, New York, 1882.

New Remedies, New York, 1882.

Oil, Paint, and Drug Reporter, New York, 1882.

Weekly Drug News, New York, 1882.

Deutsche-Amerikanische Apotheker-Zeitung, New York, 1882, July to December.

American Journal of Medical Sciences, Philadelphia, 1882.

The Pharmacist, Chicago, 1882.

The Druggist, Chicago, 1882.

Pacific Medical and Surgical Journal, San Francisco, 1882.

The Canadian Pharmaceutical Journal. Edited by E. B. Shuttleworth, 1882.

Pharmaceutical Journal and Transactions, London, 1882.

Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference, 1882.

The Chemists' Journal, 1882.

The Chemist and Druggist, London, 1882.

The Chemists' and Druggists' Diary, 1883.

Proceedings of the Philosophical Society of Glasgow, XIII., No. 1.

The Calendar of the Pharmaceutical Society of Ireland, 1881–1882.

Transactions of the American Medical Association, 1881.

Nachrichten von der K. Gesellschaft der Wissenschaften, etc. Göttingen, 1881.

Archiv der Pharmacie, Halle, 1882.

Zeitschrift des Allgemeinen Oesterreichischen Apotheker-Vereines. Wien, 1882.

Anzeiger der K. K. Akademie der Wissenschaften. Wien, 1882.

Sitzungsberichte der K. B. Akademie der Wissenchaften, 1881, 2, 3, 4. 1882, 1.

Schweizerische Wochenschrift für Pharmacie, 1882.

Annual Report of the Mercantile Library Company of Philadelphia, 1881.

Annual Report of the Astor Library Company of the City of New York, 1881.

Annual Report of the Trustees of the New York State Library for 1880.

Calendar of the University of Michigan for 1882.

Annual Report of the President to the Corporation of Brown University, 1881.

Catalogue of the University of Vermont and State Agricultural College, 1881.

Proceedings of the New Jersey Pharmaceutical Association, 1882.

Memoirs of the American Academy of Arts and Sciences, XI., I.

Report of the Long Island Historical Society for the years 1878–1881.

Transactions of the College of Physicians of Philadelphia, 1881.

Proceedings of State Medical Societies, 1882: Connecticut, C. W. Chamberlain, Secretary, Hartford; Minnesota, C. H. Boardman, Secretary, St. Paul; North Carolina, L. Julien Picot, Secretary, Littleton; South Carolina, John Forrest, Secretary, Charleston.

From the R. Biblioteca Nazionale in Firenze: Eccher (A.). Sulla teoria fisica dell' Elettrotono nei nervi. Eccher (A.). Sulle forze elettromotrici sviluppate dalle soluzioni saline. Tomassi (D.). Ricerche sulle formole di costituzione dei composti ferrici.—Parte 1ª. Cavanna (G.). Ancora sulla Polimelia nei Batraci Anuri.—Sopra alcuni visceri del Gallo cedrone. Meucci (F.). Il Globo celeste arabico del secolo XI.

LIST OF SOCIETIES, LIBRARIES, JOURNALS, AND INDIVIDUALS

To whom Complimentary Copies of the Proceedings of this Association are forwarded.

The State Libraries of all the States of the Union except Connecticut.

Maine Insane Asylum,	Augusta,	Maine.
Bowdoin College,	Brunswick,	"
Dartmouth College,	Hanover,	New Hampshire.
New Hampshire Medical Society, Dr. G. P. Conn, Secretary,	Concord,	"
Amherst College,	Amherst,	Massachusetts.
Harvard University,	Cambridge,	"
Massachusetts College of Pharmacy,	Boston,	"
American Academy of Arts and Sciences,	"	"
Medical Library Association,	"	"
City Library,	"	"
City Hospital,	"	"
Massachusetts General Hospital,	"	"
Boston Athenæum,	"	"
University of Vermont,	Burlington,	Vermont.
Brown University,	Providence,	Rhode Island.
Trinity College,	Hartford,	Connecticut.
Medical Journal and Library Association,	"	"
Connecticut Medical Society, C. W. Chamberlain, M.D.,	"	"
Silas Bronson Library,	Waterbury,	"
Yale College,	New Haven,	"
College of Pharmacy of the City of New York,	New York,	New York.
Literary and Scientific Society of German Apothecaries,	"	"
Druggists' Circular,	"	"
New Remedies, Dr. Castle, editor,	"	"
Oil, Paint, and Drug Reporter,	"	"
Weekly Drug News,	"	"
Deutsch-Americanische Apotheker Zeitung,	"	"
Pharmaceutische Rundschau,	"	"
Astor Library,	"	"
Mercantile Library,	"	"
Long Island Historical Society,	Brooklyn,	"
New Jersey State Lunatic Asylum,	Trenton,	New Jersey.
Philadelphia College of Pharmacy,	Philadelphia,	Pennsylvania.
College of Physicians,	"	"

Pennsylvania Hospital,	Philadelphia, Pennsylvania.
Academy of Natural Sciences,	“ “
American Philosophical Society,	“ “
Philadelphia Library,	“ “
Mercantile Library,	“ “
American Journal of Medical Sciences,	“ “
Medical Society of the State of Pennsylvania,	“ “
Pittsburgh College of Pharmacy,	Pittsburgh, “
Maryland College of Pharmacy,	Baltimore, Maryland.
University of Maryland,	“ “
Maryland Academy of Sciences,	“ “
Smithsonian Institution,	Washington, District Columbia.
Congressional Library,	“ “
Surgeon-General United States Army,	“ “
Surgeon-General United States Marine Hospital Service,	“ “
Surgeon-General United States Navy,	“ “
Bureau of Education,	“ “
Department of Agriculture,	“ “
United States Patent Office,	“ “
National College of Pharmacy,	“ “
Library of the American Medical Association,	“ “
Medical Society of the District of Columbia,	“ “
Richmond Pharmaceutical Association,	Richmond, Virginia.
Medical Society of Virginia, L. B. Edwards, M.D., Secretary,	“ “
South Carolina Medical Association, Dr. H. D. Fraser, Secretary,	Charleston, South Carolina.
Tennessee College of Pharmacy,	Nashville, Tennessee.
Louisville College of Pharmacy,	Louisville, Kentucky.
Cincinnati College of Pharmacy,	Cincinnati, Ohio.
Cincinnati Academy of Medicine,	“ “
Mussey Medical Library,	“ “
Longview Asylum,	Carthage, Hamilton County, O.
University of Michigan,	Ann Arbor, Michigan.
Chicago College of Pharmacy,	Chicago, Illinois.
The Druggist,	“ “
Illinois State Medical Society,	“ “
St. Louis College of Pharmacy,	St. Louis, Missouri.
St. Louis Academy of Science,	“ “
St. Louis Mercantile Library,	“ “
St. Louis Public School Library,	“ “
Kansas State University,	Lawrence, Kansas.
Minnesota State Medical Society, C. H. Boardman, M.D., Secretary,	St. Paul, Minnesota.
California College of Pharmacy,	San Francisco, California.
Pacific Medical and Surgical Journal,	“ “
Montreal College of Pharmacy, Montreal, Canada.	
Ontario College of Pharmacy, Toronto, Canada.	
Pharmaceutical Department, Halifax Medical College, Nova Scotia.	
Escuela de Farmacia, Mexico.	

Sociedad Medico-farmaceutico, Merida, Yucatan.
Sociedad de Farmacia Argentina, Buenos Ayres.
British Pharmaceutical Conference, London.
Pharmaceutical Society of Great Britain, London, 17 Bloomsbury Square.
Pharmaceutical Journal and Transactions, London.
Chemical News, London, Boy Court Ludgate Hill, E. C.
Chemist and Druggist, London, 44 Cannon Street.
Chemists' Journal, London, 12 Little Tower Street, E. C.
Journal of Applied Science, London, 3 St. Martin's Place, Charing Cross.
British Museum, London.
Philosophical Society, Glasgow.
Liverpool Chemists' Association.
Association of Chemists and Druggists, Wolverhampton.
Coventry and Warwickshire Pharmaceutical Association, Coventry.
Pharmaceutical Society at Edinburgh.
Pharmaceutical Society of Ireland, Dublin.
Nederlandsche Maatschappij ter bevordering der Pharmacie, Professor W. Stoeder, Secretary, Amsterdam.
Académie Royale de Médecine de Belgique, Bruxelles.
Société de Pharmacie Royale de Bruxelles.
Société Royale des Sciences Médicales et Naturelles, Bruxelles.
Société de Pharmacie d'Anvers.
Société de Pharmacie, Paris.
Répertoire de Pharmacie, Paris.
Schweizerische Wochenschrift für Pharmacie, A. Klunge, Aubonne.
Zeitschrift d. Allg. Oesterreichischen Apotheker-Vereins, Wien.
K. K. Gesellschaft der Aertze, Wien.
K. Akademie der Wissenschaften, Wien.
K. Bayer. Akademie der Wissenschaften, München.
University of Strassburg.
Journal de Pharmacie d'Alsace-Lorraine, N. Nicklès, Benfeld.
Archiv der Pharmacie, Waisenhausbuchhandlung, Halle.
K. Akademie der Wissenschaften, Göttingen.
Verein der Apotheker, Berlin.
Pharmaceutische Zeitung, Bunzlau.
Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.
Pharmaceutisches Institut, Dorpat, Russia.
Pharmaceutical Institution, Stockholm, Sweden.
Kongelige Norske Universitet i Christiani.
Archiv for Pharmacie, S. M. Trier, Kjobenhavn.
Denmark's Apotheker Forening, Gust. Lodze, President, Odense.
Centro Pharmaceutico Portuguez, Porto, Portugal.
R. Biblioteca Nazionale, Firenze, Italy.
Archivio di Farmazia, Roma, Italy.
Pharmaceutical Society of Victoria, Melbourne, Australia.
Pharmaceutical Society of New South Wales, Sydney.
Pharmaceutical Society of New Zealand, Auckland.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmaceutists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory, and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting; when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all meetings of the Association; in his absence or inability, one of the Vice-Presidents, or in the absence of all, a President *pro tempore* shall perform the duties of President.

ARTICLE II. He and the Vice-Presidents shall be *ex-officio* members of the Council.

ARTICLE III. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*

ARTICLE IV. In meetings the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports, and communications, and order the vote upon all proper questions at the proper time.

ARTICLE V. In all balletings, and on questions upon which the yeas and nays are taken, the President is required to vote, but his name should be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal, and in case of such equal division the motion is lost.

ARTICLE VI. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate and in case of personality or impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment; and be careful to see that business is brought forward in proper order.

ARTICLE VII. He shall have the right to call a member to the chair, in order that he may take the floor, in debate. He shall see that the Constitution and By-laws are properly enforced.

ARTICLE VIII. He shall appoint all committees, unless provided for in the By-laws, or otherwise directed by the Association.

ARTICLE IX. He shall sign the certificates of membership, and countersign all orders on the Treasurer. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE X. He shall present at each Annual Meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

ARTICLE I. The Permanent Secretary shall be elected to hold office permanently, during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $600, and the amount of his expenses incident to the meeting in addition to his salary.

ARTICLE II. He shall preserve fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the yeas and nays whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act; and shall notify every member of the time and place of each Annual Meeting.

ARTICLE IV. He shall be, *ex-officio,* a member of the Council.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall be elected annually, near the close of the Annual Meeting, and shall reside at or near the place where the next Annual Meeting of the Association is to be held.

ARTICLE II. He shall assist the Permanent Secretary in his duties; shall co-operate with the Council and any local committee in making arrangements for the Annual Meeting; shall correspond with the chairman of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each Annual Meeting, the names of such members as have failed to pay their annual contributions for three years, and also the names of such as have failed to return their certificates of membership after having been officially disconnected with the Association, and having been duly notified to return them.

ARTICLE IV. He shall present a statement of his accounts at each Annual Meeting of the Council, that they may be audited; he shall receive an annual salary of $500, and the amount of his expenses incident to the meeting in addition to his salary.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services such sum as may be annually determined upon by the Council.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the permanent Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry, and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions, together with such statistical, biographical, and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the Annual Meeting.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which shall be empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association.

ARTICLE II. The Council shall consist of seventeen members, nine of whom shall be elected by ballot by the Association, in the following manner: Three of them to serve for one year, three for two years, three for three years. At each subsequent Annual Meeting three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years.

ARTICLE III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, and Reporter on the Progress of Pharmacy of the Association, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, to be elected by ballot annually by the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association, from one Annual Meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the Annual Meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council,—a Committee on Membership, a Committee on Publication, and a Committee on Finance,—to whom shall be referred such duties as are appropriate to their respective functions as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at one session of the Association the names of those candidates for membership which have been approved by the Committee on Membership, and the applicants shall be balloted for at the next session of the Council by the members present, when a vote of two-thirds shall be sufficient to elect them.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be balloted for without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members, and the names of any who, having become disconnected with the Association, refuse to return their certificate of membership as provided by the by-laws.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings of the Association, a complete synopsis of the minutes of the Council, the reports of the President and committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as they may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

CHAPTER VII.

Of Committees.

ARTICLE I. There shall be elected annually four standing committees: A Committee on the Drug Market, to consist of five members; a Committee on Papers and Queries, a Committee on Prize Essays, and a Committee on Legislation; each to consist of three members.

ARTICLE II. The Committee on the Drug Market shall report annually the condition of the Drug Market, the fluctuations in the supply and demand of drugs and chemicals, the variations in quality, and the adulterations and sophistications coming under their observation or reported to them by others, with any suggestions or recommendations for the improvement or better regulation of the trade; and they shall be authorized to report upon any adulterations and sophistications of immediate interest, through the Pharmaceutical Journals, as soon as practicable after their discovery.

ARTICLE III. The Committee on Papers and Queries shall report, near the close of each Annual Meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interest of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same with a synopsis of its contents to the Committee on Papers and Queries previous to the third session.

ARTICLE V. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Papers and Queries, before the first annual session of the Association.

ARTICLE VI. The Committee on Prize Essays shall, within six months after the Annual Meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the committee, with such comments upon the successful essay only as they may deem proper, may be published in the Journals of Pharmacy.

ARTICLE VII. The Committee on Legislation shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on the subject has occurred during the year.

CHAPTER VIII.

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry, and Botany, who may be specially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of its Constitution and By-laws, are willing to subscribe to them, are eligible to membership.

ARTICLE II. Any person eligible to membership may make application in writing, with the indorsement of any two members of the Association in good standing, to any member of the Council, who shall report his application to the said Council.

ARTICLE III. No person shall be a member of this Association, nor shall his name be placed upon the roll, until he shall have signed the Constitution and paid into the Treasury the sum of *Five Dollars* as an initiation fee, and the annual contribution for the current year, which sums must accompany the application.

ARTICLE IV. Every member shall pay in advance to the Treasury the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years*.

ARTICLE V. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, shall become a life-member and shall be exempt from all future annual contributions.

ARTICLE VI. All local organizations of Pharmacists shall be entitled to five delegates, as their representatives in the Annual Meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year and the usual initiation fee. All credentials should be sent to the Permanent Secretary at least two weeks in advance of the Annual Meeting.

ARTICLE VII. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer, at the same time covenanting to return the same to the proper officer on relinquishing their connection with the Association.

ARTICLE VIII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-laws.

ARTICLE IX. Resignation of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE X. Any member may be expelled for improper conduct or the violation of the Constitution, By-laws, or Ethics adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

ARTICLE XI. Pharmaceutists, chemists, and other scientific men, who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office, or vote at the meetings.

CHAPTER IX.

Of Meetings.

ARTICLE I. The meetings shall be held annually; provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. The order of business at the first session of each Annual Meeting shall be as follows:

Section 1. Promptly, at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or in their absence a President *pro tempore*, shall officiate.

Section 2. In the absence of the Permanent Secretary the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates. The Secretary shall then call the roll, noting the names of the delegates and members in attendance.

Section 5. The Council shall read the names of the candidates for membership, as provided in Section 2, Article VIII., Chapter VI.

Section 6. Reports of committees shall be presented, read by their titles, the synopsis, or in full, and laid on the table for future consideration.

Section 7. The President shall call the roll of Colleges and Associations represented, requesting each delegation in turn to appoint one member, the persons so selected to act as a committee to nominate officers for the Association, the Standing Committees, and members of the Council for the ensuing year; in addition to which he shall appoint five members, who are not delegates, to act with the committee.

Section 8. The minutes of the Council shall be read in full at the Annual Meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present, or if disapproved by a majority of the members present, their acts shall be revised, so as to be acceptable to the Association.

Section 9. A committee of five shall be appointed to examine and report upon specimens exhibited.

Section 10. Incidental business may be called up.

ARTICLE III. The order of business at the second session of each Annual Meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding meeting, which may be amended if necessary, and shall then be approved.

Section 3. The report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the Officers and Committees nominated shall be balloted for.

Section 4. The officers elected shall take their respective places.

Section 5. The Council shall present names recommended for membership.

Section 6. Reports of Standing Committees shall be read.

Section 7. Reports of Special Committees shall be read.

Section 8. The second session shall close with the examination of specimens on exhibition.

ARTICLE IV. The order of business at subsequent sessions shall be determined by the Council, with the consent of the Association.

ARTICLE V. *Section* 1. The Association invites manufacturers and others to exhibit at the Annual Meeting crude drugs, chemicals, pharmaceutical preparations, chemical and pharmaceutical apparatus and utensils, and such objects as possess a general scientific or special pharmaceutical interest.

Section 2. The following articles shall not be admitted to these exhibitions: Proprietary and patented medicines, medicinal or pharmaceutical preparations, the names of which have been copyrighted, or the complete working formula for which is withheld, and such chemical preparations or mixtures which are offered under other than their proper scientifically recognized names.

Section 3. The Committee on Exhibition, appointed under Chapter VIII., Article II., Section 9, shall report during the meeting on the articles exhibited, with such comments as in their judgment may be deemed proper.

CHAPTER X.

Of Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

ARTICLE I. In all such points of order as are not noticed in these By-laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By laws.

ARTICLE III. No one or more of these By-laws shall be suspended.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, who shall be elected by ballot by the Council to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence, or on account of inability from any cause, the Vice-Chairman; or, in the absence of both, a Chairman *pro tempore* shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council.

ARTICLE II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

ARTICLE III. He shall read all papers handed him by the Chairman for that purpose, shall call and record the yeas and nays whenever they are required to be called; he shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting.

CHAPTER IV.

Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of five members of the Council to be elected annually by ballot. The Permanent Secretary and the Treasurer of the Association shall be *ex officio* members of this committee. The committee shall elect their chairman immediately after their election by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present the list of applicants for membership, who have complied with the requirements of the By-Laws of the Association, to the Council.

ARTICLE III. They shall furnish appropriate obituary notices of deceased members for publication in the Proceedings.

CHAPTER V.

On Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council, who shall elect their chairman immediately after their own election by the Council.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Proceedings, and may select annually the portrait of a deceased member to be issued with the Proceedings.

CHAPTER VI.

On Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members. They shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. They shall annually at the meetings, and after due notice through the Pharmaceutical Journals, receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount of material required, it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. After considering these applications, the Committee shall, at as early a date as possible, report to the Council, recommending such grants from the available funds as they may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

On Meetings.

ARTICLE I. The Council shall meet on the day immediately preceding that fixed for the assembling of the Association, and at such other times as they may adjourn to, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special meeting shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the standing committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its committees, and which can be disposed of by a positive or a negative vote, the Chairman of the Council, or the chairman of the committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present.

ARTICLE III. Every proposition to alter or amend these By-laws shall be submitted in writing, and may be balloted for at the next session of the Council, when, upon receiving the votes of three-fourths of the members present, it shall become a part of these By-laws.

FORM OF APPLICATION FOR MEMBERSHIP.

Approving of the objects of the American Pharmaceutical Association, I am desirous of joining it in membership; and having read its Constitution and By-laws, I hereby signify my approval of the same, and subscribe to them.

____

Address, ________________________________

I hereby agree to return my certificate of membership in the American Pharmaceutical Association to the Treasurer of that body, if I shall hereafter cease to be connected in membership with it.

TESTIMONIALS.

The undersigned, members in good standing, being personally acquainted with of testify to his moral character, his skill as a practical druggist and pharmaceutist, and his professional probity and good standing, and they recommend him for membership in the American Pharmaceutical Association.

Names.	Address.

ROLL OF MEMBERS.

HONORARY MEMBERS.

UNITED STATES OF AMERICA.

Daniel B. Smith, Philadelphia, Penna., 1856.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.

Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.

Dr. Robert Bentley, *London*, 1872.

Henry B. Brady, *Newcastle-on-Tyne*, 1871.

Dr. J. Redwood, *London*, 1871.

Michael Carteighe, *London*, 1882.

Thomas Greenish, *London*, 1882.

Joseph Ince, *London*, 1882.

Richard Reynolds, *Leeds*, 1882.

George W. Sandford, *London*, 1882.

Geo. F. Schacht, *Clifton, Bristol*, 1882.

Peter Squire, *London*, 1882.

FRANCE.

Dr. Augustin A. Délondre, *Sèvres*, 1871.

Stanilas Martin, *Paris*, 1872.

Dr. G. Planchon, *Paris*, 1877.

Dr. J. Léon Soubeiran, *Montpellier*, 1871.

GERMANY.

Dr. Christian Brunnengraeber, *Rostock*, 1882.

Dr. Adolph Duflos, *Annaberg*, 1871.

Dr. F. A. Flückiger, *Strassburg*, 1868.

Dr. Hermann Hager, *Pulvermühle bei Fürstenberg*, 1868.

Dr. Carl Schacht, *Berlin*, 1882.

Dr. G. C. Wittstein, *Munich*, 1868.

GREECE.

Dr. Xaver Landerer, *Athens*, 1877.

ITALY.

Cav. Niccola Sinimberghi, *Rome*, 1882.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.

J. Von Martenson, *St. Petersburg*, 1882.

SWITZERLAND.

Dr. Edward Schaer, *Zurich*, 1877.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of life-members in SMALL CAPITALS. Names of life-members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Mobile.

Candidus, Philip Charles,	1857
Hawkins, Joseph Thomas,	1878
Mohr, Charles,	1871
Moore, Thomas F.,	1878
Punch, William Francis,	1874
Savage, Thomas Jameson,	1881
Van Antwerp, Garet,	1880

ARKANSAS.

Hot Springs.

Cabell, George William,	1880
Eisele, Martin A.,	1881
Newman, Alcoin Eason,	1880
Pollard, Frank Wilder,	1880

CALIFORNIA.

San Francisco.

Brackett, Aurick Smith,	1868
Calvert, John,	1870
Dawson, John H.,	1882
Elbe, Constantine Berthold,	1877
Joy, Edwin Wolcott,	1882
Lengfeld, Abraham Louis,	1879
Mack, Adolph,	1880
Moffit, Thomas S.,	1861
Painter Emlen,	1870
Runyan, Edward Wheelock,	1875
Searby, William Martin,	1882
Simpson, William,	1870
Steele, Henry,	1859
Steele, James Gurden,	1879
Vreeland, Phrank Louis,	1880
Wenzell, William Theodore,	1870

Eureka, Humboldt Bay.

Powell, Robert Baldwin,	1880

Los Angeles.

Preuss, Edward Anthony,	1882

Marysville, Yuba Co.

Flint, John Henry,	1873

Oakland.

Brown, Joseph John,	1876

Santa Clara.

Oberdeener, Moses,	1880

Vallejo, Solano Co.

Frost, James,	1870
Topley, James,	1869

COLORADO.

Central City.

Best, John,	1866

Denver.

Blattermann, George Walter,	1876
Hartung, Hugo Rudolph,	1876
Scholtz, Edmund Louis,	1881
Seward, Richard,	1880
Steinhauer, Frederick,	1881
Walbrach, Arthur,	1881

COLUMBIA, DISTRICT OF.

Washington.

Becker, Charles,	1875
Berrian, George Washington,	1857
Bury, Edward Berkley,	1870
Christiani, Charles,	1874
Cromwell, Zachariah William,	1870
Drew, John Waters,	1876
Duckett, Walter G.	1876
Dufour, Clarence Reuter,	1876
Entwisle, William Burton,	1873
Ferguson, Robert Benedict,	1867
Knabe, Gustavus Alexander,	1876
Lewis, Samuel Edwin,	1875
Major, John Richards,	1873
Milburn, John Alexander,	1858
O'Donnell, James Dominic,	1870

Pettingill, Edward True, . . 1880
Reinlein, Paul, ... 1856
Scala, William Franklin, . . 1876
Schafhirt, Adolph Julian, . . 1876
Simms, Giles Green Craycroft, . 1860
Thompson, William Scott, . 1871
Tyson, Samuel Ellicott, . . 1857

CONNECTICUT.

Ansonia.

Bristol, Charles Edward, . . 1880

Hartford.

Chapin, Frederick Hastings, . 1880
Goodrich, Stephen, . . . 1875
Goodwin, Lester Henry, . . 1875
Rapelye, Charles Andrew, . 1876
Williams, John Kirby, . . 1875

Litchfield.

Gates, Howard Eugene, . . 1873

Middletown.

Pitt, John Richard, Jr., . . 1872

Naugatuck.

May, James Oscar, . . . 1875

New Britain.

Thomson, Edward Willett, . 1880

New Haven.

Benedict, Willis, . . . 1882
Francis, Walter R., . . . 1882
Gessner, Emil Adolph, . . 1878
Kelsey, Henry, Jr., . . . 1873
Spalding, Warren Alphonso, . 1876
Sperry, Herman Jay, . . 1880
Wells, Romanta, . . . 1877
Wood, Alonzo Felton, . . 1876

Norwalk.

Betts, Howard Seeley, . . 1880

Norwich.

Osgood, Hugh Henry, . . 1875
Sevin, Nathan Douglass, . . 1875

Stamford.

Haight, William Bogardus, . 1872

Waterbury.

Dikeman, Nathan, . . . 1859
Munson, Luzerne Ithiel, . . 1872
Wilcox, Frederick, . . . 1878
Woodruff, Roderick Samuel, . 1876

West Winsted.

Phelps, Dwight, . . . 1873

Westville.

Melvin, J. Lacy, . . . 1882

Winsted.

Renouff, James Theron, . . 1877

DELAWARE.

Wilmington.

Belt, Zedekiah James, . . 1876
Smith, Linton, ... 1870

FLORIDA.

Fort George.

Rollins, John Francis, . . 1859

Jacksonville.

Hughes, Benjamin Longmore, . 1878

Monticello.

Palmer, John Dabney, . . 1875

Waldo.

Wheeler, Lucien Fitch, . . 1858

GEORGIA.

Albany.

Welch, Leonard Edward, . . 1878

Atlanta.

Behre, Charles H., . . . 1882
Bradfield, Louis Henry, . . 1878
Rankin, Jesse Willis, . . 1877
Schumann, Peter John, . . 1878
Schumann, Theodore, . . 1860

Athens.

Jacobs, Joseph, ... 1882

Augusta.

Land, Robert Henry, . . . 1859

Cartersville.

Curry, David W., . . . 1878

Cuthbert.

Stanford, James William, . . 1878

Macon.

Brunner, Norman Isaac, . . 1878
Hunt, Leonard Washington, . 1878
Ingalls, John, ... 1876
McConville, Thomas Aloysius, . 1864

Milledgeville.

Grieve, Fleming Grantland,	1859

Rome.

Fenner, William Roane,	1871
Turner, Prior Lee,	1878

Savannah.

Yonge, St. John R.,	1878

ILLINOIS.

Aurora.

Chase, John Bidwell,	1880

Bradford, Stark Co.

Plummer, David Graham,	1869
Plummer, William Pitt,	1881

Camp Point.

Bartells, George C.,	1881

Chicago.

Bartlett, Nicholas Gray,	1864
BIROTH, HENRY,	1865
Blahnik, Lorenz,	1881
Block, William Frederick.	1863
Borland, Matthew Wilson,	1876
Buck, George,	1860
Button, Charles E.,	1881
Cowdrey, Robert Hall,	1879
Dale, William Macmillan,	1880
Fischer, Edward J.,	1875
Fox, Daniel S.,	1872
Fuller, Henry Weld,	1865
Fuller, Oliver Franklin,	1869
Gale, Edwin Oscar,	1857
Gale, William Henry,	1857
Garrison, Herod Daily,	1869
Hallberg, Carl Swante Nicanor.	1879
Hamilton, Emil,	1881
Hartwig, Charles F.,	1881
Henemann, Henry William,	1869
Hogan, Lewis Cass,	1876
Hogey, Julius Henry,	1880
Jacobus, Judson Schradlow	1870
Kadlec, Lawrence Wesley,	1880
Krusemarck, Charles,	1876
Lord, Thomas,	1882
Martin, Hugo W. C.,	1881
Maynard, Henry Sherman,	1880
McPherson, George,	1865
Milleman, Philip Lionel,	1866
Moore, James Penn,	1872
Mortimer, William Golden,	1877
Parsons, John,	1865
Plantz, C. Herman,	1881
Reinhold, William,	1866
Sargeant, Ezekiel Herbert,	1864
Somers, Frank Giddings,	1877
Stuart, Ennere Boyce,	1880
Sweet, Henry,	1865
Thayer, Frederick A.,	1880
Vogeler, Adolph Gustav,	1876
Wheeler, Charles Gilbert,	1876
WHITFIELD, THOMAS,	1865
Wilson, Julius Henry,	1869
Woltersdorf, Louis,	1865
Zahn, Emil Augustus,	1881

Danville.

Winslow, Edwin Cook,	1879

Galesburg.

Clark, Albert Burr, Jr.,	1868

Greenfield.

Mook, Philip George,	1880

Highland.

Knoebel, Edmund,	1882
Mueller, Adolphus,	1871

Mascoutah.

Henrich, George,	1875

Peoria.

Allaire, Charles Bowen,	1880
Ebert, Albert Ethelbert,	1864
Zimmermann, Charles,	1881

Peru, La Salle Co.

Hattenhauer, Robert C.,	1881

Quincy.

Schroder, Hermann,	1871

Roseville.

Brewer, Percival,	1881

Windsor, Shelby Co.

Smyser, William Christie,	1880

INDIANA.

Alexandria.

Heagy, Weems Augustus,	1880

Anderson.

Brandon, Joseph Francis,	1879
Buck, Albert Byron,	1879
Searle, Gideon Daniel,	1880

Aurora.

Marshall, Hubert Joseph, 1877
Riddell, James A., 1879

Evansville.

Schmidt Florian Charles, 1882
Schlaepfer, Henry John, 1879

Fairmount.

Edwards, Nathan Wilson, 1879

Indianapolis.

Beyschlag, Charles, 1880
Borst, George Frederick, 1881
Dill, J. B., 1878
Driggs, Nathaniel S., 1881
Earnshaw, William Jonathan, 1881
Frauer, Herman E., 1881
Haag, Julius A., 1879
Hurty, John N., 1882
Kielhorn, Henry, 1874
Lambert, John Albert, 1879
Lilly, Eli, 1878
Lynn, Winfield Scott, 1882
Martin, Emil, 1878
Metzner, Adolph, 1879
Miller, Charles Edward, 1880
Mueller, Louis Henry, 1879
Schrader, Henry, 1869
Sloan, George White, 1857
Staley, Michael C., 1881

Jasper, Dubois Co.

Mehringer, Joseph A., 1882

Jeffersonville.

Loomis, John Clarence, 1876

Kokomo.

Irvin, William Armstrong, 1879

Lafayette.

Hilt, David, 1879
Reule, John, 1882
Yeakel, Nathan Webb, 1879

Lawrenceburgh.

Ferris, Charles Edward, 1874

Kendallville.

Lohman, George H., 1872

Madison.

Harper, Frank Merritt, 1874

New Albany.

Conner, Jefferson Somerville, 1876
Knoefel, August, 1879

Rensselaer.

Kanal, Emmet, 1882

Seymour.

Andrews, Josiah Harding, 1879

South Bend.

Eliel, Leo, 1882

Tell City.

Schreiber, August, 1876

Terre Haute.

Baur, Jacob, 1879
Buntin, William Campbell, 1874

Vincennes.

Watjen, Herman J., 1882

IOWA.

Boone.

Townsend, Abram R., 1880

Burlington.

Wigert, Carl Reinhold, 1876

Cedar Falls, Black Hawk Co.

Bryant, William Cullen, 1881

Cedar Rapids, Linn Co.

Truax, Charles, 1882

Clinton.

Hardy, William Henry, 1881
Major, Oscar, 1880

Davenport.

Ballard, John Winthrop, 1871

Decorah.

Weiser, Emilius Ilgenfritz, 1880

Des Moines.

Weaver, Charles Augustus, 1880

Dubuque.

Ferdinand, George Adam, 1879
Ruete, Theodore William, 1870

Dyersville.

Bigelow, Israel, Jr., 1880

Fort Dodge.

Crawford, R. W., 1881
Oleson, Olaf Martin, 1877

Fort Madison.

Schafer, George Henry, 1871

Indianola.

Buffington, Cyrus Adams, 1880

Iowa City.

Boerner, Emil Louis, 1877

Marshalltown.

Birchard, Abner Theodore, 1881
Corell, Thomas Jefferson, 1864

Monticello.

Tiarks, Hermann, 1876

Newton.

Hogin, George B., 1881

Ottumwa, Wapello Co.

Ennis, William W., 1881
Prall, Delbert Elwyn, 1879

Sioux City.

Moore, Silas Harwood, 1880
More, Arthur James, 1881

Waterloo.

Wangler, Conrad D., 1876

KANSAS.

Atchison.

Chapman, Garrett A., 1880
Frisby, Frank, 1880

Coffeyville.

Slosson, George, 1882

Florence.

Standford, William A., 1881

Girard.

Walker, George, 1881

Lawrence.

Leis, George, 1869

Leavenworth.

Brown, Robert J., 1862

Peabody.

Roberts, Daniel John, 1881

Sabetha.

Behne, Frank J., 1881

Salina.

Seitz, Oscar, 1881

Stirling, Rice Co.

Plummer, Edwin Morton, 1881
Plummer, Henry Solomon, 1881

Strong.

McCollunn, Neil A., 1881

Wyandotte.

Sturtevant, T. Frank, 1880

KENTUCKY.

Bardstown.

Venable, Richard Henry, 1879

Carrollton.

Geier, Oscar William, 1880

Catlettsburg.

Patton, William Allison, 1873

Covington.

Nodler Peter, 1870
Reiss, Edward Charles, 1882
Zwick, George Gilbert, 1874

Eminence.

Porter, Chelton Scott, 1882

Flemingsburg.

Reynolds, John J., 1876

Frankfort.

Averill, William Henry, 1874

Lewisport.

Martin, Charles C., 1881

Louisville.

Beckmann, Oscar Albert, 1879
Colgan, John, 1867
Davis, Vincent, 1874
Diehl, Conrad Lewis, 1863
Huddart, John Fletcher, 1870
Jones, Simon Newton, 1870
Kessler, Edward Fredrik, 1879
Miller, Frederick Christopher, 1874
Newman, George Abner, 1866
Pfingst, Edward Charles, 1874
Pfingst, Ferdinand John, 1867
Pfingst, Henry Adolph, 1874
Radenmaker, Hermann Henry, 1879
Rogers, Wiley, 1874
Scheffer, Emil, 1872
Schiemann, Edward Bernard, 1880
Schoettlin, Albert John, 1882

Springer, William Theodore,	1882
Strassel, William,	1870
Sutton, Peter Priest,	1871
Wilder, Graham,	1868
Newport.	
Feth, Joseph George,	1880
Nicholasville.	
Oxley, Jefferson,	1878
Owensboro.	
Courtney, William Thomas,	1879
Shelbyville.	
McKenney, Jesse Fisher,	1878
Uniontown.	
Hardigg, William L.,	1881

LOUISIANA.

New Orleans.	
Girling, Robert Nast,	1876
Keppler, Christian Lewis,	1882
Lyons, Isaac Luria,	1875
Baton Rouge.	
Brooks, Francis Marion,	1879
Bayou Goula.	
Viallon, Paul Louis,	1870
Franklin.	
Frere, Alexander G.,	1882
New Iberia.	
Lee, James Augustin,	1856
Plaquemine.	
Dellavallade, Jean Michel,	1873
Shreveport.	
Morris, Thomas Henry,	1881
Thibodeaux.	
Roth, Eugene Norbert,	1880
Thibodeaux, Joseph Theogine,	1870

MAINE.

Augusta.	
Partridge, Charles Kimball,	1867
Bangor.	
Harlow, Noah Sparhawk,	1859
Sweet, Caldwell,	1881
Bath.	
Anderson, Samuel,	1876
Belfast.	
Moody, Richard Henry,	1876
Biddeford.	
Boynton, Herschell,	1875
Blue Hill.	
Morrill, Benjamin,	1876
Eastport.	
Shead, Edward Edes,	1866
Ellsworth.	
Parcher, George Asa,	1875
Lewiston.	
Wakefield, Seth Davis,	1875
Pittsfield.	
Libby, Henry F.,	1882
Portland.	
Cummings, Henry Thornton,	1853
Dana, Edmund, Jr.,	1877
Frye, George Carleton,	1879
Hay, Henry Homer,	1867
Jordan, William Henry,	1871
Perkins, Benjamin Abbott,	1878
Phillips, Walter Fiske,	1859
Waterville.	
Plaisted, James Hamilton,	1875
Yarmouth.	
Richardson, James Hamilton,	1868

MARYLAND.

Baltimore.	
Baxley, Jackson Brown,	1856
Brack, Charles,	1876
Dohme, Charles Emile,	1863
Dohme, Lewis,	1859
Eareckson, Edwin,	1875
Elliott, Henry Alexander,	1859
Emich, Columbus Valentine,	1863
Frames, James Parker,	1868
Gosman, Adam John,	1870
Hancock, John Francis,	1863
Hassencamp, Ferdinand,	1872
Jackson, Vincent Rodman,	1876
Jefferson, John Henry Bailey,	1868
Jennings, Nathaniel Hynson,	1857

Lauer, Michael John,	1865
Lautenbach, Robert,	1870
Monsarrat, Oscar,	1856
Moore, Jacob Faris,	1856
Morrison, John Ellwood,	1863
Muth, John Philip,	1864
Perkins, Elisha Henry,	1857
Risk, Clarence H.,	1882
Roberts, Joseph,	1856
Russell, Eugene Janus,	1856
Russell, Edward Walton,	1863
Sappington, Richard,	1870
Sharp, Alpheus Phineas,	1855
Thompson, William Silver,	1856
Thompson, William Partlow,	1874
Thomsen, John Jacob,	1856
Tilyard, Charles Slade,	1867
Webb, John Alansen,	1870
Winkleman, John Henry,	1861
Woodward, Samuel Morris,	1874

Chestertown.

Stam, Colin F.,	1882

Cumberland.

Campbell, William Pendleton,	1879
Herman, John George,	1878
Shriver, Henry,	1876
Shryer, Thomas Wilson,	1875

Frederick City.

Schley, Steiner,	1878

Hagerstown.

Winter, Jonas,	1863

MASSACHUSETTS.

Boston.

Babo, Leopold,	1859
Bartlett, William Williams,	1875
Bassett, Charles Harrison,	1867
Bolles, William Palmer,	1875
Boyden, Edward Cleveland,	1874
Browne, Clarence Edward,	1880
Burley, Edward Porter,	1877
Burnett, Joseph,	1852
Campbell, Isaac Towle,	1859
Canning, Henry,	1865
Carter, Solomon,	1865
Chapin, William Amos,	1880
Colcord, Samuel Marshall,	1852
Colton, James Byers,	1865
Cramer, Max,	1881
CUTLER, EDWARD WALDO,	1859
Davenport, Bennett Franklin,	1879
Doliber, Thomas,	1859
Drury, Linas Dana,	1871
French, George Washington,	1865
Godding, John Granville,	1875
Goodale, Thomas Trefethen,	1879
Hoyt, George Melvin,	1875
Jenkins, Luther Lincoln,	1867
Jenks, Thomas Leighton,	1875
Jones, James Taber,	1875
Kelly, Edward Samuel,	1871
Kent, Robert Restieaux,	1855
Leary, Jeremiah Thomas,	1869
Lincoln, Henry Ware,	1853
Lowd, John Colby,	1871
Luce, Edgar Henry,	1879
Markoe, George Fred. Holmes,	1863
Melvin, James Samuel,	1853
Metcalf, Theodore,	1857
O'Brien, James John,	1875
Patch, Edgar Leonard,	1872
Patten, Ichabod Bartlett,	1858
Pierce, William Herbert,	1879
Prescott, Horace Augustus,	1875
Restieaux Thomas,	1853
Sewall, David Jewett,	1875
Sharples, Stephen Paschell,	1875
Shedd, Edwin Walter,	1879
SHEPPARD, SAMUEL AIRUS DARLINGTON,	1865
Siegemund, Charles Augustus,	1882
Smalley, Elijah,	1860
Snow, Jesse Walker,	1875
Stowell, Daniel,	1875
Tompkins, Orlando,	1859
Tower, Levi, Jr.,	1860
Trask, Charles Mitchell,	1875
Turner, Thomas Larkin,	1853
Underwood, Charles Gordsford,	1865
Webster, Stephen,	1875
Wilson, Benjamin Osgood,	1859
Winslow, Samuel Wallis,	1875
Woodbridge, George Washington,	1859
Wright, William Raith,	1875

Andover.

Parker, George Hawkins,	1874

Cambridge.

Hubbard, John Henry,	1866
Wood, Edward Stickney,	1879

Cambridgeport.	
Bayley, Augustus Ramsey,	1859
Orne, Joel Stone,	1859
Orne, Charles Parker,	1874
Charlestown.	
Marshall, Ernest Clifton,	1875
Stacey, Benjamin Franklin,	1860
Chelsea.	
Buck, John,	1855
Danvers.	
Woodman, Warren Horton,	1881
Dedham.	
Follansbee, Sherman,	1875
East Pepperell.	
Dunham, Charles Sumner,	1875
Fitchburg.	
Choate, John,	1877
Great Barrington.	
Eddie, Charles Hurlbert,	1882
Lillie, Charles Herbert,	1875
Whiting, Frederick Theodore,	1863
Haverhill.	
Frothingham, Edward Gilman,	1875
Underhill, William Harvey,	1879
Hingham.	
Hunt, James Lewis,	1865
Holyoke.	
Ball, Charles Ely,	1880
Morgan, Richard Evan,	1875
Laurence.	
Whitney, Henry Martyn,	1859
Lee.	
Pease, Francis Merrick,	1880
Lowell.	
Bailey, Frederick,	1869
Butler, Freeman Hall,	1874
Hood, Charles Ira,	1871
Kidder, Samuel, Jr.,	1859
Lynn.	
Colcord, Joseph Webster,	1882
Proctor, Benjamin,	1859
Marlborough.	
Hartshorn, Frederick Arthur,	1880
Maynard.	
Wells, Charles William,	1879
Middleboro.	
Drake, Charles William,	1873
Monson.	
Phipps, John Mellen,	1875
Natick.	
Daniels, Samuel Olney,	1875
Reed, Frederick,	1881
New Bedford.	
Blake, James Edwin,	1866
Hadley, Frank Rufus,	1872
Lawton, Charles Henry,	1873
Lawton, Horace Allen,	1873
Shurtleff, Israel Hammond,	1875
Taylor, John Pitman,	1875
Newton.	
Hudson, Arthur,	1882
Newton Centre.	
Noble, John Joseph,	1875
Peabody.	
Grosvenor, David P., Jr.,	1881
Pittsfield.	
Atwood, Luther Lee,	1876
Quincy.	
Whall, Joseph Stokes,	1873
Rockland.	
Easton, Luther Waite,	1875
Estes, Joseph Josslyn,	1870
Rockport.	
Blatchford, Eben,	1857
Salem.	
Luscomb, William E.,	1881
Nichols, Thomas Boyden,	1876
Price, Charles H.,	1882
Saugus.	
Hill, James Ward Harris,	1880
Shelbourne Falls.	
Baker, Edwin,	1875
Somerville.	
Cowdin, George Henry,	1875
Flanagan, Lewis Cass,	1875

Springfield.

Alden, Charles Packard, . . 1874
Webber, Joseph Terrence, . 1873

Stockbridge.

Clarke, William Bills, . . 1880

Walpole.

Pilsbury, Frank Otis, . . 1881

Waltham.

Johnson, Horace Irving, . . 1880
Sanderson, George Henry, . 1880

Warren.

Harwood, Frank Lucian, . . 1875
Harwood, Lucian, . . . 1875

West Acton.

Hutchins, Isaiah, . . . 1880

West Stockbridge.

Moore, James S. . . . 1882

Worcester.

Bush, William, ... 1875
Dinsmore, George Frederick, . 1879
Scott, Nelson Ryan. . . . 1859
Williams, Duane Burnett, . . 1881

MICHIGAN.

Adrian.

Ross, Ellison Halsey, . . 1880

Ann Arbor.

Brown, Henry J., . . . 1882
Eberbach, Ottmar, . . . 1869
Prescott, Albert Benjamin, . 1871
Wrampelmeier, Theodore J.. . 1882

Battle Creek.

Wardell, Robert C., . . . 1860

Chelsea.

De Puy, Casper Edward, . . 1879

Detroit.

Caldwell, James William, . . 1875
Hawkins, Henry, . . . 1880
Johnston, William, . . . 1860
Mackimmie, George D., . . 1881
Ronnefeld, Theodore, . . 1866
Vernor, James, ... 1866
Wilder, Hans Matthias, . . 1866

East Saginaw.

Garrigues, Samuel Smith, . 1855
Melchers, Henry, . . . 1869

Evart, Osceola Co.

Bigelow, Charles F., . . . 1881

Ionia.

Gundrum, George, . . . 1882

Kalamazoo.

McDonald, George, . . . 1871

Muskegon.

Jesson, Jacob, ... 1872

Saginaw City.

Keeler, William Henry, . . 1872
Moll, William, ... 1869

Schoolcraft.

James, George Riley, . . 1869

Ypsilanti.

Morgan, James, ... 1859

MINNESOTA.

Minneapolis.

Nienstaedt, Hermann, . . 1879

Mankato.

Jones, John Roger, . . . 1881

Preston.

Weiser, Albert, ... 1880

St. Paul.

Noyes, Daniel R., . . . 1882
Simmon, Karl, ... 1880
Stierle, Adolph, ... 1882

MISSISSIPPI.

Aberdeen.

Tindall, Graham McFarlane, . 1880

Bay St. Louis.

Deléry, Edgar, ... 1878

Columbus.

Frazee, George Blair, . . 1880

Fort Gibson.

Shreve, John A., . . . 1880

Jackson.

Ash, Matthew Franklin, . . 1856

Okolona.

Buchanan, Henry Clay,	1880

MISSOURI.

St. Louis.

Addington, William B.,	1878
Ahlbrandt, Henry Ernst,	1877
Alexander, Maurice William,	1871
Blank, Alois,	1871
Boehm, Solomon,	1871
Catlin, Ephron,	1871
Chamberlain, Guilford Tracy,	1853
Crawford, William Harper,	1864
Curtman, Charles Otto,	1871
Drake, Robert Samuel,	1878
Featherston'h, Edward Richard,	1871
Good, James Michener,	1871
Grandjean, Charles,	1871
Grandjean, Eugene,	1871
Hemm, Francis,	1881
Jones, Charles Kendall,	1867
Kalb, Theodore,	1864
Klie, George Henry Charles,	1878
Leitch, Arthur,	1860
Mallinckrodt, Edward,	1869
Meyer, Christian Fred. Gottlieb,	1860
O'Brien, John W.,	1881
Oldberg, Oscar,	1873
Pauley, Frank Charles,	1879
Physick, Henry Sandford,	1870
Plumer, William S.,	1879
Reichenbach, Frederick Francis,	1879
Richardson, James,	1882
Richardson, Joseph Clifford,	1871
Sander, Enno,	1858
Scheffer, Henry William,	1863
Sennewald, Ferdinand William,	1865
Tomfohrde, John William,	1878
Ude, George,	1871
Uhlich, Ferdinand G.,	1881
Vardick, August Henry,	1874
Westmann, Frank Henry.	1882
Williamson, Edward John,	1876
Witte, Louis Edward,	1871

Boonville.

Sombart, John E.,	1881

Cameron.

Garrett, Oscar N.,	1881

Carrollton.

Pettit, Henry M.,	1881

Carthage.

Caffee, Amos Henry,	1881

Chillicothe.

Boyce, Samuel F.,	1871

Columbia.

Hurt, James Francis,	1879
Webb, McHenry,	1879

Glenwood.

Gray, Gilbert D.,	1881

Hannibal.

Walker, Charles,	1881

Hopkins.

Browning, Woodville,	1882

Kansas City.

Arnold, Henry Clay,	1881
Ford, James M.,	1881
Ford, William Thomas,	1878
Gallagher, John A.,	1881
Lahme, Charles Adolph,	1881
Love, Charles Edward,	1881
Young, Judson J.,	1881

Macon.

Field, Amos,	1871

Marshall.

Franklin, Philip H.,	1881

Mexico, Adrian Co.

Llewellyn, John Frederick,	1867

Miami, Saline Co.

Edmonds, Augustus R.,	1881

Odessa, Lafayette Co.

Beardslee, Othniel,	1881

Weston.

Parr, John Conrad,	1856

NEBRASKA.

Omaha.

Goodman, Charles Frederick,	1871
Kuhn, Norman Archibald,	1878

NEVADA.

Virginia City.

Perkins, William Alexander,	1869

NEW HAMPSHIRE.

Concord.

Eastman, Charles Smith, . . 1871
Underhill, George Francis, . 1874

Dover.

Pinkham, Alonzo Taylor. . . 1874
Rackley, Benjamin Franklin, . 1874
Tufts, Charles Augustus, . 1856
Vickery, William Henry, . . 1874
Wingate, Jeremiah Young, . 1875

Exeter.

Merrill, Charles Augustus, 1858

Manchester.

Hubbard, George Jones, . . 1881
Lull, George Edward, . . 1881
Miville, Francis Charles, . . 1877
Perry, Bayard Taylor, . . 1876

Nashua.

Russell, Elias Smith, . . . 1875
Wallace, Austin Edward, . . 1879
Whitman, Nelson Samuel, . . 1875

New Market.

Dearborn, George Luther, . . 1873
Twombly, John Herbert, . . 1880

Portsmouth.

Marvin, Thomas Ellison Oliver, 1875
Preston, Andrew Peabody, . 1881
Thacher, Joseph Haven, . . 1859

Rochester.

Hanson, Dominicus, . . . 1878
Sanderson, Stephen Francis, . 1880

Somersworth.

Carleton, Robert Marsh, . . 1880
Moore, George, ... 1880

Suncook.

Hildreth, Charles Francis, . . 1874

NEW JERSEY.

Belvidere.

Smith, Arthur G., . . . 1881

Bloomfield.

Scherff, John Philip, . . . 1877

Bordentown.

Ca lake, George Middleton, . 1880

Burlington.

Vandegrift, John A., . . . 1867

Camden.

Brown, Albert Potts, . . . 1870
Test, Alfred William, . . 1870

East Orange.

Rumsey, Samuel Louis, . . 1876

Elizabeth.

Brant, Edmund Wade, . . 1882
Drake, Jonathan Baker, . . 1875
Kent, Henry Avery, Jr., . . 1880
Loveland, William F., . . 1882
Oliver, William Murray, . . 1875

Elizabethport.

Frohwein, Richard, . . . 1867

Englewood.

Rockefeller, Lucius, . . . 1880

Freehold.

Walker, Ansell, ... 1880
Walker, John P., . . . 1881

Hackensack.

Adams, Hazen Wooster, . . 1879

Hoboken.

Eschmann, Fred. William R., . 1880
Klussman, Hermann, . . 1876

Jersey City.

Abernethy, Maxwell, . . . 1865
Dougherty, Samuel Edward, . 1875
Foulke, James, . . . 1881
Laird, William Rudolph, . . 1867
Turner, Isaac Worthington, . 1882
White, George Henderson, . 1868
Wienges, Conrad, . . . 1875

Matawan, Monmouth Co.

Slater, Frank H., . . . 1882

Medford.

Thorn, Henry Prickett, . . 1879

Moorestown.

Worthington, Jeremiah Willits, 1873

Morristown.

Carrell, Eugene Ayers, . . 1875
Dalrymple, Charles Hoagland, . 1882

Mount Holly.

Miller, Louis,	1874
WHITE, AARON SMITH,	1860

Newark.

Betzler, Jacob,	1880
Bruguier, Francis,	1876
Dreher, Ernest,	1869
Holzhauer, Charles,	1873
Nichols, Edward Payson,	1870
Post, William Henry,	1880
Sayre, William Henry,	1877
Smith, Charles Bradley,	1868
Smith, Israel Preston,	1876
Stamford, William Harrison,	1876
Townley, William Mattison,	1875
Vandervoord, Ransford Wells,	1870
Van Winkle, Abraham,	1871

New Brunswick.

Rust, William,	1870

Newton.

Ryerson, Henry O.,	1882

Ocean Grove.

Vansant, Robert Hays,	1879

Orange.

Harlow, Wickham Newman,	1874
Parsons, Robert Edwin,	1877
Vreeland, Cyrus Elias,	1880

Orange Valley.

Yatman, John Lewis,	1880

Plainfield.

Reynolds, Howard Prescott,	1875
Shaw, Robert Johnston,	1875
Voorhees, William Henry,	1868

Red Bank, Monmouth Co.

Lockwood, Samuel Alexander,	1880

Roselle.

Tiernan, Frank Mortimer,	1880

Salem.

Bassett, Joseph,	1880

South Amboy.

JAQUES, GEORGE WASHINGTON,	1869

Trenton.

De Cou, James Clarke,	1880
Mangold, Gustavus Adolph,	1875
Rickey, Randal,	1870

NEW YORK.

New York City.

Ambler, Starr Hoyt,	1876
Atwood, Herman White,	1873
Balluff, Paul,	1860
Balser, Gustavus,	1875
Bedford, Peter Wendover,	1859
Bendiner, Samuel,	1882
Billings, Henry Merry,	1869
Bond, Joseph Romulus,	1876
Booth, Clarence Frederick,	1875
Buehler, Edward Handy,	1874
Burdge, Jacob Uriah,	1876
Campbell, Horace Willard,	1875
Carle, John, Jr.,	1860
Cassebeer, Henry Adolphus,	1872
Cassebeer, Henry Anthony,	1858
Chandler, Charles Frederic,	1867
Chase, Charles Dyer,	1881
Colby, Albert Ladd,	1881
Collins, Louis Dell,	1880
Creuse, Jules Leon Augustine,	1871
Currie, John Harper,	1858
Davis, Benjamin,	1869
Dick, Dundas,	1879
Dietrich, William August,	1881
Ditman, Andrew J.,	1868
Drischler, Francis,	1881
Dung, Albert Charles,	1872
Eimer, Charles,	1872
Fairchild, Benjamin Thomas,	1875
Fisher, William,	1862
Fougera, Edmund Charles,	1867
Fraser, Edward Allen,	1873
Frey, John,	1865
Fridenberg, Eugene L.,	1881
Frohwein, Theobald,	1862
Gardner, Charles H.,	1881
Gardner, Robert Winthrop,	1867
Gilmore, John Wesley,	1872
Gellatly, William Adams,	1858
Gridley, Junius,	1853
Griffith, William Henry,	1874
Hale, Frederick,	1855
Hancock, John Henry,	1870
Haviland Henry,	1857
Hays, David,	1867
Hebberling Gottfried,	1867

Hegeman, J. Niven,	1880
Henes, William Frederic,	1876
Higgins, James Starkey,	1862
Hobart, Charles Henry,	1880
Hoffmann, Frederick,	1867
Horner, James Monroe,	1867
Hohenthal, Charles Frederic Leberecht,	1865
Hudnut, Alexander,	1857
Ihlefeld, Conrad H.,	1881
Imgard, Julius,	1882
Inness, George,	1878
Johnson, Edward Lawless,	1860
Jungmann, Julius,	1879
Kalish, Julius,	1875
Kimmel, Henry,	1867
Knapp, Frank Fiero,	1880
Krehbiel, Gustavus,	1865
Laber, Julius,	1881
Lazell, Lewis T.,	1858
Lehlbach, Paul Frederick,	1872
Lehn, Louis,	1874
Linn, William Blair,	1880
Lins, Albert H.,	1881
Macmahan, Thomas Jackson,	1871
Main, Thomas Francis,	1872
Marsh, Edward H.,	1858
McIntyre, Byron Floyd,	1876
McIntyre, Ewen,	1875
McKesson, John, Jr.,	1867
Millhau, Edward Leon,	1878
Molwitz, Ernest,	1867
Morrison, Thomas Ormsby,	1876
Mott, Henry Augustus,	1879
Neergaard, Sidney Herbert,	1880
Newton, John,	1880
O'Neil, Henry Maurice,	1879
Osann, Bernhard,	1882
Osmun, Charles Alvin,	1868
Otto, Charles Henry,	1880
Page, George Sheppard,	1880
Parker, John Herbert,	1880
Parrish, Clemmons,	1868
Parsons, Henry B.,	1882
Parsons, Matthias W.,	1880
Peixotto, Moses Levi Maduro,	1869
Pfingsten, Gustavus,	1875
Powell, William Reuben,	1880
Reed, John Henry,	1880
Reichard, Frederick Alfred,	1871
Rice, Charles,	1870
Ricksecker, Theodore,	1875
Robbins, Charles Albert,	1876
Robbins, Daniel C.,	1862
Royce, Lucien Merriam,	1866
Sands, George Gedney,	1867
Scofield, James Stephen,	1867
Seabury, George John,	1876
Shearer, Edward Young,	1880
Shedden John William,	1859
Sheils, George Emanuel,	1860
Skelly, James Joseph,	1866
Starr, Thomas,	1870
Still, Allen Henry,	1880
Tidball, Walton Caldwell,	1881
Tscheppe, Adolph,	1876
Tuska, David,	1881
Van der Emde, Reinhold,	1879
Wanier, George Simon,	1876
Weaver, James,	1860
Weinman, Oscar Christian,	1873
Weisman, Augustus William,	1869
White, Philip Augustus,	1872
Wichelus, Frederick,	1881
Wickham, William Hull,	1870
Wilson, William,	1876
Wohlfarth, Justin,	1879
Zellhoefer, George,	1876

Brooklyn.

Aspinwall, Walter A.,	1880
Baker, George M.,	1880
Bassett, Francis Morgan,	1860
Benjamin, James Henry,	1878
Brooks, George Washington,	1879
Close, George Cassidy,	1858
Curtiss, Charles Grenville,	1866
Coutts, Foxwell Curtis, Jr.,	1875
Davis, William Mortimer,	1879
Day, Carlos Erastus,	1870
Daycock, William Henry,	1874
De Forest, William Pendleton,	1879
Dennin, Charles,	1875
Douglas, Henry, Jr.,	1875
Dudley, Oscar Earle,	1877
Dunn, John Augustus,	1867
Heydenreich, Emile,	1867
Jones, Thomas,	1868
Kitchen, Charles William,	1865
Krieger, Philip,	1876
Levy, Adolph,	1877
Livingston, Barent Van Buren,	1872

McElhenie, Thomas Diamond,	1872
Menninger, Henry Joseph,	1866
Newman, George Anthony,	1865
Nicot, Louis Emile,	1875
Niebrugge, John August,	1861
Nietsch, Adolph Frederick William,	1872
Ollif, James Henry,	1867
Owens, Richard John,	1860
Pyle, Cyrus,	1859
Raas, Francis,	1877
Ramsperger, Gustavus,	1860
Reusch, Ernst,	1882
Reynolds, Charles E.,	1882
Rich, Willis S.,	1882
Sayre, Edward Augustus,	1877
Snyder, Ambrose Chancellor,	1867
Squibb, Edward Hamilton,	1882
Squibb, Edward R.,	1858
Stevens, Luther Fuller,	1879
Strachan, William Edward,	1880
Tartis, Alfred Joseph,	1867
Ubert, Julius,	1876
Underhill, Joseph James,	1879
Vincent, William,	1870
Wendler, Robert Frederick Wm.,	1876
Wynn, William,	1867

Albany.

Clement, Henry Bratt,	1880
French, William Barker,	1880
Gaus, Charles Henry,	1879
Gaus, Louis Henry,	1880
Gibson, Charles H.,	1880
Huested, Alfred Birch,	1879
McClure, Archibald,	1880
McClure, William Henry,	1880
Michaelis, Gustavus,	1882
Santer, Louis,	1879
Turner, George Heather,	1880
Walker, William,	1880

Angola, Erie Co.

Oatman, Le Roy Sutherland,	1872
Penfold, Henry J.,	1882

Athens.

Post, Elisha,	1876

Auburn.

Stanley, Edgar Clark,	1880

Bath, Steuben Co.

Knight, George Ely,	1880
Dupuy, Eugene,	1852

Bergen.

Fisher, Amos Sawyer,	1880

Binghamton.

Inloes, A. J.,	1879

Buffalo.

Darlington, James Augustus,	1882
Drefs, Charles A.,	1882
Harries, Oscar L.,	1882
Hayes, Horace Phillips,	1880
Peabody, William Huntington,	1857
Rano, Charles Orlando,	1866
Rieffenstahl, Julius,	1879
Stoddart, Thomas,	1881
Tibbs, William Henry,	1871

Castile, Wyoming Co.

Rolph, Charles W.,	1882

Cambridge.

Williams, Richard Julius Coudray,	1880

Catskill.

Du Bois, William Laneman,	1880
Dykeman, George Albert,	1880
Mott, George Frederick,	1880

Cornwall, Orange Co.

Hazen, Peter Perry,	1882

Croton Landing.

Henry, Charles (Dworniczak),	1881

Elmira.

Holmes, Clayton Wood,	1876

Fishkill on Hudson.

Moith, Augustus Theodore,	1860

Flushing.

Hepburn, John,	1873
James, William T.,	1882

Geneseo, Livingston Co.

Rogers, Arthur Henry,	1882

Gloversville, Fulton Co.

Miller, Jason Albert,	1879
Van Auken, Jerrie A.,	1880

Greenbush.

Munger, John F.,	1881

Hannibal.

Brewster, Wadsworth J.,	1880

Holley, Orleans Co.	
Bishop, Francis M.,	1882
Hume, Alleghany Co.	
Hopper, George S.,	1881
Jamaica, L. I.	
Baylis, Lewis Fosdick,	1880
Goodale, Harvey Galusha,	1879
Johnstown.	
Cahill, John Francis,	1880
Kinderhook.	
Van Alstyne, Franklin B.,	1882
Little Falls, Herkimer Co.	
Hurley, John,	1882
Lockport.	
Sweet, Frederick K.,	1880
Luzerne, Warren Co.	
Miller, George Yerrington,	1872
Malone.	
Miller, Robert McCleferty,	1880
Middletown.	
KING, JAMES THEODORE,	1859
Rogers, William Henry,	1859
Mount Vernon.	
Gill, George,	1872
Newburgh.	
Chapman, Isaac C.,	1882
Gorham, John Ransom, Jr.,	1879
New Lebanon.	
Tilden, Henry Augustus,	1858
Niagara Falls.	
Griffith, Hiram Elijah,	1875
Nyack, Rockland Co.	
De Graff, David,	1879
Olean.	
Coon, James Van Deventer,	1880
Oswego.	
Morse, Edward Webster,	1880
Owego.	
Napier, Henry Brewster,	1879
Palmyra.	
Cool, James Harris,	1882
Pike, Wyoming Co.	
Sweet, William S.,	1882
Port Chester.	
Hyler, William Henry,	1875
Port Jervis.	
Cook, George Edward,	1872
Potsdam.	
Thatcher, Harvey Dexter,	1865
Poughkeepsie.	
Sherwood, Hezekiah Strong,	1870
Richfield Springs.	
Smith, Willard Alfred,	1880
Rochester.	
Aman, Henry,	1882
Davis, Edward Hatch,	1880
Haass, G. Herman,	1872
Paine, James Dixon,	1857
Schmitt, Joseph M.,	1882
Smith, Willard,	1880
Rome.	
Bissell, John Gordon,	1875
Broughton, Albert James,	1876
Owens, James Alanson,	1882
Rondout.	
Laycock, Washington,	1857
Sag Harbor.	
Lobstein, Jacob Fred. Daniel,	1868
Tooker, William Wallace,	1879
Saratoga Springs.	
Colcord, Jonathan Marshall,	1880
Fish, Charles Frederick,	1866
Mingay, James,	1873
Pennington, Thomas Henry Sands,	1877
Schenectady.	
Davis, Edward L.,	1881
Duryee, George Elliott,	1880
Hanson, Willis Tracy,	1880
Silver Creek, Chautauqua Co.	
Montgomery, Melvin,	1882
Spencerport.	
Milliner, William Seward,	1877

Stapleton, S. I.	
Feeny, James,	1882
Stillwater, Saratoga Co.	
Schermerhorn, Winfield Scott,	1880
Suspension Bridge.	
Rommel, Emanuel,	1882
Syracuse.	
Dawson, Edward Seymour, Jr.,	1876
Powers, Charles J.,	1882
Snow, Charles Wesley,	1876
Tompkinsille, L. I.	
Bassett, John William,	1875
Tonawanda, Erie Co.	
Scoville, Charles Emery,	1882
Utica.	
Blaikie, William,	1879
Wappinger's Falls.	
Shrader, John L.,	1880
Watertown.	
Packard, Durand Clarence,	1880
Waterville, Oneida Co.	
Bissell, Emery Gilbert,	1879
Wellsville, Alleghany Co.	
Hall, Edwin Bradford,	1879
Yonkers.	
Finkel, Charles Edwin,	1880

NORTH CAROLINA.

Ashville.	
Lee, James Hardy,	1880
Beaufort.	
Davis, Josiah Benjamin,	1880
Mace, Francis Borden,	1878
Chapel Hill.	
Saunders, Richard Banbury,	1858
Durham, Orange Co.	
Vaughan, P. W.,	1882
Fayetteville.	
Hinsdale, Samuel Johnston,	1875
Sedbury, Bond E.,	1882
Greensboro.	
Porter, W. C.,	1880
Raleigh.	
Simpson, William,	1873
Tarboro.	
Cordon, John Gray Myers,	1882
Zoeller, Edward Victor,	1878
Washington.	
Gallagher, Charles Kewell,	1857
Wilmington.	
Hardin, John Haywood,	1881
McIlhenny, John K.,	1881
Munds, James Cassidy,	1878
Winston.	
Smith, Samuel Holmes,	1879

OHIO.

Cincinnati.	
Bain, Andrew Watson,	1874
Beebe, John Walter,	1880
Eger, George,	1864
Elfers, Joseph C.,	1881
Faust, Charles,	1879
Feemster, Joseph Hall,	1873
Fennell, Adolphus,	1864
Goodman, Emanuel,	1879
Gordon, William John Maclester,	1854
Greve, Theodore Lund August,	1864
Greyer, Julius,	1880
Heinemann, Otto,	1864
Helman, Charles Martin,	1864
Heun, Emil,	1881
Hildreth, Newton Gough,	1879
Hottendorf, Augustus,	1864
Judge, John French,	1866
Karmann, William,	1864
Koehnken, Herman Henry,	1875
Kuenze, Robert Meinrad,	1880
Lammert, C. Joseph,	1881
Lloyd, John Uri,	1870
Martin, William J.,	1881
Meininger, Albert,	1881
Merrell, George,	1879
Merrell, William Stanley,	1854
Phillips, Charles Wilson,	1881
Rendigs, Charles Peter,	1876
Reum, Herman Frank,	1864
Ruppert, John,	1880
Sauer, Louis W.,	1882
Schreck, Leo S.,	1881

Schuermann, Frederick,	1881
Seredino, Herman,	1880
Thorp, Abner,	1879
Vieter, Herman,	1881
Wagner, Henry,	1876
Walton, Harry C.,	1881
Wayne, Edward Simmons,	1854
Wells, Jacob David,	1864
Yorston, Matthew Mackay,	1864

Akron.

Armstrong, Andrew Morehouse,	1876
Smith, Joseph Stahle,	1878

Ashtabula.

Thurber, Almon Russell,	1880

Bellefontaine.

Wallace, Archibald Collins,	1879

Bellville, Richland Co.

Warren, Mrs. E. F.,	1882

Bryan.

Snyder, Alva Leach,	1873

Canton.

Somers, George Horace,	1881

Chillicothe.

Howson, Walter Henry,	1875
Nipgen, John A.,	1879

Circleville.

Evans, Samuel B.,	1881

Cleveland.

Asplin, John Harding,	1882
Benedict, James L.,	1882
Bruce, James,	1882
Dreher, Louis,	1881
Gaylord, Henry Cleveland,	1869
Gegelein, Frederick L.,	1881
Glines, George W.,	[illegible]
Haler, Louis Anthony,	1882
Hartness, William Henry,	1872
Hechler, George Louis,	1882
Hopp, Lewis Christopher,	1876
Huling, Bruce,	1872
Keiper, Louis,	1881
Linden, Hugo F.,	1882
May, Arthur,	1881
Mayell, Alfred,	1872
Myers, Daniel,	1882
Parsons, Richard,	1882
Rosenwasser, Nathan,	1880
Schambs, George Mathias,	1882
Schellentrager, E. A.,	1882
Scott, William Johnston,	1872
Slosson, Frank W.,	1882
Smithnight, Albert,	1882
Spencer, Peter Ignatius,	1872
Spieth, William F.,	1882
Urban, Jacob P.,	1881
Vaupel, Charles P.,	1872
Weichsel, Franz,	1881

Columbus.

Adolph, Albert,	1882
Herbst, Frederick W.,	1882
Huston, Charles,	1872
Kaufman, George B.,	1882
Schueller, Ernst,	1881
Schueller, Frederick William,	1880
Sherwood, Louis Walker,	1882

Dayton.

Wensthoff, Otto Sittell,	1879

Delphos.

Evans, Hugh W.,	1881
Wahmhoff, Julius Henry,	1880

Gallipolis.

Schaaf, Justus Henry,	1875

Hamilton.

Schwartz, John C.,	1871

Ironton.

Ball, Theophilus Benedict,	1874

Logan.

Harrington, Frank,	1869

London.

Smith, Auburn,	1880

Massillon, Stark Co.

Baltzly, Zachariah Taylor,	1876
Kirchhofer, Peter Paul,	1881

Middletown.

Johnson, Charles Brayton,	1876

Napoleon.

Leist, Jacob L.,	1881

Navarre.

Grossklaus, John Ferdinand,	1859

New Lisbon, Columbiana Co.	
Pettit, Louis Clark,	1881
New Madison, Darke Co.	
Hagemann, James F. S.,	1882
North Baltimore, Wood Co.	
Clark, Frank P.,	1882
Saint Paris.	
Chance, Samuel,	1881
Salem, Columbiana Co.	
Hawkins, Michael Smith,	1870
Sandusky.	
Graham, William Augustus,	1876
South Charleston.	
Armstrong, George Revington,	1877
Spring Valley.	
Lyon, C. Wesley,	1881
Springfield.	
Casper, Thomas Jefferson,	1867
Coblentz, Virgil,	1882
Ludlow, Charles,	1872
Siegenthaler, Harvey N.,	1882
Troupe, Theodore,	1881
Tiffin.	
Marquardt, Jacob F.,	1881
Toledo.	
Hobley, Charles,	1872
Reed, I. N.,	1881
Troy.	
Tobey, Charles William,	1879
Watertown.	
Bohl, Conrad,	1881
West Liberty.	
Kurfurst, Henry F.,	1881
Westerville.	
Baumgartner, Frederick,	1880
Wilmington.	
Foland, Daniel J.,	1881
Wooster.	
Ohliger, Lewis Philip,	1871
Zanesville.	
Graham, Willis H.,	1881
Hatton, Edgar Melville,	1878

OREGON.

Portland.

Sitton, Charles Edward,	1878

PENNSYLVANIA.

Philadelphia.

Angney, John R.,	1867
Bakes, William Courtney,	1864
Bauer, Louis Gustavus,	1867
Blair, Andrew,	1865
Blair, Henry Cowen,	1868
Borell, Henry Augustus,	1874
Boring, Edwin McCurdy,	1867
Bower, Henry,	1860
Bower, Henry Albert,	1868
Bowker, James,	1876
Bullock, Charles,	1857
Bunting, Samuel Sellers,	1857
Campbell, Hugh,	1876
Campbell, Samuel,	1864
Cook, Thomas Penrose,	1877
Dobbins, Edward Tompkins,	1867
Eberle, Charles Louis,	1865
Eddy, Henry Clay,	1869
Eldridge, George Washington,	1865
Ellis, Evan Tyson,	1857
England, Robert,	1868
Fox, Peter Paul,	1869
Früh, Carl Daniel Stephan,	1876
Gaillard, Edward,	1876
Genois, Louis,	1876
Gerhard, Samuel,	1873
Grahame, Israel Janney,	1856
Grove, John Eberly,	1868
Haenchen, Charles Eugene,	1865
Hance, Edward H.,	1857
Hancock, Charles West,	1868
Hassinger, Samuel Eliphat Reed,	1880
Hazlett, Edward Everett,	1876
Heintzelman, Joseph Augustus,	1858
Hoskinson, J. Thomas, Jr.,	1881
Hurst, John Corry,	1868
Jenks, William J.,	1858
Johnson, Benjamin Franklin,	1859
Jones, Alexander Henry,	1874
Jones, David Sexton,	1859
Jones, Edward Charles,	1864
Kay, Isaac Henry,	1870
Keasbey, Henry Griffith,	1873
Keeney, Caleb Reynolds,	1868

Keys, Roger,	1868
Kline, Mahlon Norwood,	1876
Koch, Louis,	1872
Krewson, William Egbert,	1875
MAISCH, JOHN M.,	1856
Mattern, William Kline,	1876
Mattison, Richard Vornselons,	1873
McIntyre, William,	1868
McKelway, George Irvin,	1874
Mellor, Alfred,	1864
Miller, Adolphus William,	1868
Milligan, Decatur,	1867
Moore, Joachim Bonaparte,	1860
Moorhead, William Walker,	1876
Murray, Bernard James,	1882
Newbold, Thomas Mitchell,	1876
Ottinger, James Jeremiah,	1876
Parrish, Dillwyn,	1857
Patterson, James Lemon,	1876
Perot, Thomas Morris,	1857
Pile, Gustavus,	1881
Poley, Francis Henry,	1880
Power, Frederick Belding,	1872
Preston, David,	1868
Procter, Wallace,	1874
Remington, Joseph Price,	1867
Riley, Charles William,	1868
Rittenhouse, Henry Norman,	1857
Robbins, Alonzo,	1865
Roche, Edward Manning,	1868
Rosengarten, Mitchell George,	1869
Scattergood, George James,	1860
Shaw, Louis,	1877
Shivers, Charles,	1860
Shinn, James Thornton,	1860
Shoemaker, Richard Martin,	1869
Shryock, Allen,	1868
Simpers, John Wilmer,	1874
Somers, Richard Miller,	1876
Spannagel, Charles Christian,	1874
Taylor, Alfred Bower,	1852
Taylor, Henry Burnes,	1876
Thompson, William Beatty,	1858
Trimble, Henry,	1876
Troth, Samuel Fothergill,	1857
Walsh, Robert H.,	1879
Warner, William Richard,	1857
Webb, William H.,	1867
Weber, William,	1872
Weidemann, Charles Alexander,	1868
Wendel, Henry Edward,	1873
Wiegand, Thomas Snowdon,	1857
Wolff, Lawrence,	1882
Wright, Archibald Wesley,	1868
Zeilin, John Henry,	1859

Alleghany City.

Armor, Alpheus,	1882
Eggers, Frederick Hermann,	1872
Robertson, Archibald C.,	1882

Allentown.

Klump, Charles C.,	1880

Beaver, Beaver Co.

Andriessen, Hugo,	1875

Bellefonte, Centre Co.

Zeller, William S.,	1881

Bethlehem.

Luckenback, Edward Hermann,	1870
Meyers, Edward Tobias,	1867

Bristol.

Pursell, Howard,	1880

Carlisle.

Horn, Wilbur Fisk,	1876

Chambersburg.

Cressler, Charles Henry,	1868

Columbia.

Meyers, James Alfred,	1867

Danville.

Sechler, James C.,	1878

Easton.

Weaver, John Archibald,	1873

Harrisburg.

George, Charles Theodore,	1873
Miller, Jacob Augustus,	1873

Hyde Park, Luzerne Co.

Morgan, Benjamin George,	1876

Lancaster.

Heinitsh, Charles Augustus,	1857

Lebanon.

Karch, Joseph Jacob,	1876
Lemberger, Joseph Lyon,	1858
Redsecker, Jacob Henry,	1881

Lenni, Delaware Co.

Murray, Francis Marion,	1876

Lewisburg, Union Co.

Schaffle, Samuel Wilson Wykoff,	1876

Lock Haven.

Prieson, Adolph,	1880

Mansfield, Tioga Co.

Ridgway, Lemuel A.,	1882

Milton.

Alleman, Emanuel Allison,	1880

Minersville.

Burns, John Kellar,	1876

New Brighton.

Kennedy, Thomas,	1880
Walker, Francis William, Jr.,	1878

New Wilmington.

Smenner, J. Edwin,	1881

Norristown.

Stahler, William,	1880

Oil City.

Griffith, Albert Richard,	1870
Griffith, Alphonso de Lamartine,	1879

Pittsburg.

Cherry, James Bonbright,	1868
Emanuel, Louis,	1878
Holland, Samuel Smith,	1876
Hostetter, Charles Michael,	1870
Kelly, George A.,	1882
Kerr, James, Jr.,	1876

Pittston.

Rhoades, Stephen Howard,	1876

Pottsville.

Deibert, Thomas Irvin,	1882
Kennedy, George Washington,	1869

Quakertown.

Penrose, Stephen Foulke,	1871

Reading.

Raser, John Bernard,	1872
Stein, Jacob Henry,	1869
Ziegler, Philip Milton,	1867

Scottdale, Westmoreland Co.

Cummings, T. F.,	1882
McNeil, John Murray,	1382

Smethport, McKean Co.

Armstrong, Alvin Backus,	1882

Tamaqua.

Albrecht, Emil,	1875

Titusville.

Thompson, E. K.,	1882

Towanda.

Porter, Henry Carroll,	1880

West Chester.

Evans, Joseph Spragg,	1877

White Haven.

Driggs, Charles M.,	1881

Wilkesbarre.

Hair James,	1881
Wolf, Nathaniel,	1878

Williamsport.

Cornell, Edward Augustus,	1873
Duble, Jesse Balderston,	1870

York.

Patton, John Franklin,	1880

RHODE ISLAND.

East Greenwich.

Congdon, Albert James,	1860

Newport.

BLACKMAN, LYMAN RAWSON,	1865
Groff, John E.,	1879
Taylor James Henry,	1875

Niantic.

Vars, Enoch Wilcox,	1880

Providence.

Blanding, William Bullock,	1875
Calder, Albert Layton,	1859
Cone, John Wright,	1876
Danforth, Edmund Culver,	1878
Mason, Norman Nelson,	1875
Reynolds, William Keyes,	1876
Wood, Mason B.,	1882

Westerley.

Collin, Albert B.,	1882
Latimer, Robert Fulton,	1857

SOUTH CAROLINA.

Aiken.

Harbers, William Henry, 1875

Charleston.

Aimar, Charles Pons, 1879
Burnham, Edward S., 1874
Eckel, Augustus William, 1874
Gibson, William Andrew, 1874
Luhn, Gustavus Johann, 1873
Michaelis, Charles Otto, 1874
Moise, Benjamin Franklin, 1876
Panknin, Charles Frederick, 1874

TENNESSEE.

Memphis.

Hessen, George Archibald, 1880
Robinson, James Scott, 1869
Safford, William Burr, 1875

Nashville.

Burge, James Oscar, 1878
Laurent, Eugene Leonard, 1872
Thomas, James, Jr., 1875
Wharton, John Criddle, 1872
Wharton, William Henry, 1876

TEXAS.

Austin.

Morley, William Jarman, 1876

Bryan.

McLelland, Robert Clayton, 1880

Clarksville.

Harper, Harry W., 1881

Corsicana.

Campbell, John Gordon, 1879

Fort Worth.

Powell, Thomas Wallace, 1874
Wells, Ebenezer Miller, 1878

Galveston.

Thompson, Thomas Charles, 1876
Voelcker, Rudolph, 1878

Terrill.

Brown, Charles Scott, 1873

VERMONT.

Brandon.

Crossman, George Alvin, 1872

Burlington.

Van Patten, William James, 1876

Chester.

Pierce, Frederick Webster, 1879

Morrisville.

Gates, Amasa O., 1876

Rutland.

Higgins, Albert Warren, 1870
Lewis, Elam Clark, 1870

St. Johnsbury.

Bingham, Charles Calvin, 1875
Randall, George Dallas, 1875

Windsor.

Paine, Milton Kendall, 1875

VIRGINIA.

Fredericksburg.

Hall, Marshall Carter, 1870

Norfolk.

Masi, Frederick Henry, 1873

Petersburg.

Knock, Thomas Franklin, 1882

Richmond.

Baker, Thomas Roberts, 1873
Blunt, Ira Washington, 1873
Bodeker, Henry, 1873
Purcell, John Barry, 1875
Scott, William Henry, 1873
Thomas, Oscar Ernest, 1882

WASHINGTON TERRITORY.

Seattle.

Kellogg, Gardner, 1882

Walla Walla.

Holmes, Henry Elliott, 1880

WEST VIRGINIA.

Charleston, Kanawha Co.

Boggs, Edwin Leslie, 1872
Potterfield, Clarence A., 1882

Wheeling.

Bocking, Edmund, 1874
Gray, William Howlett, 1880
McCullough, Winfield Scott, 1880
Monkemoller, Charles, 1880
Nagle, Asher Christian, 1881
Williams, William H., 1880
Young, Alexander Thomas, 1876

WISCONSIN.

Beloit.

Fenton, Frank S., 1881

Evansville, Rock Co.

Griswold, De Witt C., 1881

Fond du Lac.

Huber, Jacob Charles, 1880

Geneva.	
Miner, Morris Ashbel,	1880
Geneva Lake.	
Arnold, Robert Bruce,	1879
Janesville.	
Heimstreet, Edward Burton,	1874
Prentice, Fred. F.,	1876
Kenosha.	
Robinson, Frederick,	1881
Menasha.	
Bates, Augustin E.,	1881
Milwaukee.	
Abbott, Frank,	1880
Bantly, Bartholomew,	1881
Coffin, Samuel Lockwood,	1879
Conrath, Adam,	1881
Dadd, John Alfred,	1880
Drake, John Ransom,	1860
Schrank, Henry Charles,	1876
Senier, Frederick Sutherland,	1874
Neillsville.	
Sniteman, Charles C.,	1881
Watertown.	
Eberle, Herman Theodore,	1875
Whitewater.	
Warne, Henry Lee,	1881

DOMINION OF CANADA.

NEW BRUNSWICK.

Moncton.	
Estey, Edwin M.,	1882

NOVA SCOTIA.

Halifax.	
Simson, Francis Cook,	1876

ONTARIO.

Goodrich.	
Jordan, Frederick Francis,	1877
Guelph.	
Harvey, Edmund,	1877
Lindsay.	
Gregory, Edmund,	1875
London.	
Saunders, William,	1860
Simcoe.	
Foster, William Orville,	1881
Stratford.	
Waugh, George James,	1862
Toronto.	
Henderson, John,	1877
Hodgetts, George,	1877
Johnson, Stuart William,	1881
Knowles, Harvey Armage,	1877
Lander, John Cambridge,	1877
Lowden, John,	1875
Pearce, James H.,	1880
Robinson, William Sherlock,	1877
Rose, Henry John,	1872
Windsor.	
Priddy, Robert Samuel,	1882

QUEBEC.

Montreal.	
Evans, Henry Sugden,	1880
Gray, Henry Robert,	1867
Quebec.	
Giroux, Edmund,	1878
McLeod, Roderick,	1880

BERMUDA.

Hamilton.	
Heyl, James B.,	1863

U. S. OF COLOMBIA.

Guatemala.	
Herbruger, Florence Charles,	1876

MEMBERS RESIDING IN EUROPE.

Burroughs, Silas Mainvielle, London, England,	1876
Morris, Lemuel Iorwerth, Strassburg, Germany,	1880
Slocum, Frank Leroy, Strassburg, Germany,	1880
Wellcome, Henry Solomon, London, England,	1875

ALPHABETICAL LIST OF MEMBERS.

HONORARY MEMBERS.

Attfield, Dr. John, Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W. C., England.

Bentley, Dr. Robert, Professor of Materia Medica and Botany to the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W. C., England.

Brady, Henry B., F.R.S., Hillfield, Gateshead, England.

Brunnengraeber, Dr. Christian, Rostock, Germany.

Carteighe, Michael, F.I.C., 180 New Bond Street, London, W., England.

Délondre, Dr. Augustin A., 20 Rue des Juifs, Paris, France.

De Meyer, A. T., Bruxelles, Belgium.

De Vrij, Dr. J. E., 54 Heerengracht, the Hague, Netherlands.

Dragendorff, Dr. G., Professor of Pharmacy at the University of Dorpat, Russia.

Duflas, Dr. Adolph, Professor, Annaberg, Germany.

Flückiger, Dr. Frederick A., Professor in the University of Strassburg, Germany.

Gille, Norbert, Professor in the École Vétérinaire de l'État, Bruxelles, Belgium.

Greenish, Thomas, F.C.S., 20 New Street, Dorset Square, London, N. W., England.

Hager, Dr. Hermann, Pulvermühle bei Fürstenberg, Germany.

Ince, Joseph, F.L.S., 11 St. Stephen's Avenue, Shepherd's Bush, W., London, England.

Landerer, Dr. Xaver, Professor, Athens, Greece.

Martenson, Magister J. von, Kinderhospital des Prinzen von Oldenburg, St. Petersburg, Russia.

Martin, Stanislas, Paris, France.

Planchon, Dr. G., Professor, Paris, France.

Redwood, Dr. Theophilus, Professor of Pharmacy to the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W. C., England.

Reynolds, Richard, F.C.S., Cliff Lodge, Hyde Park, Leeds, England.

Sandford, George W., 47 Piccadilly, London, W., England.

Schacht, Dr. Carl, 56 Mittelstrasse, Berlin, N. W., Germany.

Schacht, George F., F.C.S., 52 Royal York Creset., Clifton, Bristol, England.

Schaer, Dr. Edward, Professor of Pharmacy, Zurich, Switzerland.

Sinimberghi, Cav. Niccola, Via Condotti, Roma, Italy.

Smith, Daniel B. 4717 Germantown Avenue, Philadelphia, Pa.

Soubeiran, Dr. J. Léon, Professor of Pharmacy, École de Pharmacie, Montpellier, France.

Squire, Peter, F.L.S., 12 York Gate, Regent's Park, London, N. W., England.

Waldheim, Anton von, 17 Himmelpfortgasse, Wien, I., Austria.

Wittstein, Dr. G. C., 47 Königinstrasse, Munchen, Germany.

ACTIVE MEMBERS.

Abbott, Frank, Milwaukee, Wis.

Abernethy, Maxwell, No. 188 Newark avenue, Jersey City, N. J.

Adams, Hazen W., No. 73 Main street, Hackensack, N. J.

Addington, William B, No. 700 Olive street, St. Louis, Mo

Adolph, Albert, Friend and Seventh streets, Columbus, O.

Ahlbrandt, Henry E., S. E. cor Fifteenth and Carr streets, St. Louis, Mo.

Aimar, Charles P., No. 469 King street, Charleston, S. C.

Albrecht, Emil, Tamaqua, Pa.

Alden, Charles P., No. 270 Main street, Springfield, Mass.

Alexander, Maurice W., S. E. cor. Fourth and Market streets, St. Louis, Mo.

Allaire, Charles B., No. 108 Main street, Peoria Ill.

Alleman, Emanuel A., care of Cyrus Brown, Milton, Pa.

Aman, Henry, No. 139 East Main street, Rochester, N. Y.

Ambler, Starr Hoyt, Ninth avenue and Eighty-fourth street, New York.

Anderson. Samuel, No. 48 Front street, Bath, Me.

Andrews, Josiah H., S. E. cor. Chestnut and Second streets, Seymour, Ind.

Andriessen, Hugo, P. O. Box 39, Beaver, Beaver County, Pa.

Angney, John R, cor Fifth and Spruce streets, Philadelphia, Pa.

Armor, Alpheus, No. 57 Taylor avenue, Allegheny City, Pa.

Armstrong, Alvin B., Smethport, McKean County, Pa.

Armstrong, Andrew M., No. 106 East Market street, Akron, O.

Armstrong, George R., No. 2 Union Block, South Charleston, O.

Arnold, Henry C., Kansas City, Mo.

Arnold, R. Bruce, cor. Main and Broad streets, Geneva Lake, Wis.

Ash, Matthew F., P. O. Box 129, Jackson, Miss.

Aspinall, Walter A., Nos. 1147 and 1149 Fulton street, Brooklyn, N. Y.

Asplin, John H., No. 227 Prospect street, Cleveland, O.

Atwood, Herman W., No. 846 Broadway, New York.

Atwood, Luther L., No. 7 North street, Pittsfield, Mass.

Averill, William. H., No. 435 Main street, Frankfort, Ky.

Babo, Leopold, No. 12 Boylston street, Boston, Mass.

Bailey, Frederick, P. O. Box 314, Lowell, Mass.

Bain, Andrew W., City Hospital, Cincinnati, O.

Baker, Edwin, Bridge street, Shelbourne Falls, Mass.

Baker, George M., No. 487 Manhattan avenue, Brooklyn, N. Y.

Baker, T. Roberts, No. 919 East Main street, Richmond, Va.

Bakes, William C., No. 145 North Tenth street, Philadelphia, Pa.

Ball, Charles E., No. 221 High street, Holyoke. Mass.

Ball, Theophilus B., No. 105 Second street, Ironton, O.

Ballard, John W., No. 106 West Second street, Davenport, Iowa.

Balluff, Paul, No. 632 Sixth avenue, New York.

Balser, Gustavus, No. 137 Avenue B, New York.

Baltzly, Zacharias T., Opera Block, Massillon, O.

Bantly, Barthol., Milwaukee, Wis.

Bartells, George C., Camp Point, Ill.

Bartlett, Nicholas G., N. W. corner Twenty-third street and Indiana avenue, Chicago, Ill.

Bartlett, William W., No. 675 Shawmut avenue, Boston, Mass.

Bassett, Charles H., No. 504 Washington street, Boston, Mass.

Bassett, Francis M., cor. Atlantic avenue and Court street, Brooklyn, New York.

Bassett, John W., Tomkinsville, L. I., N. Y.

Bassett, Joseph, No. 119 Market street, Salem, N. J.

Bates, Aug. E., Milwaukee, Wis.

Bauer, Louis G., corner Fifth and Fairmount avenue, Philadelphia, Pa.

Baumgartner, Frederick, Nos. 701–703 Main st., cor. Seventh, Westerville, O.

Baur, Jacob, Terre Haute, Ind.

Barley, J. Brown, corner Howard and Franklin streets, Baltimore, Md.

Bayley, Augustus R., No. 607 Main street, Cambridgeport, Mass.

Baylis, Lewis F., P. O. Box 34, Jamaica, Queen's County, L. I.

Beardslee, Othniel, Odessa, Lafayette County, Mo.

Becker, Charles, No. 1367 Thirty-second street, West Washington, D. C.

Beckmann, Oscar A., No. 686 Broadway, corner Baxter avenue, Louisville, Ky.

Bedford, P. Wendover, No. 10 Gold street, New York.

Beebe, John Walter, Court and Plum streets, Cincinnati, O.

Behne, Frank J., Sabetha, Kansas.

Behre, Charles H., Schumann's Pharmacy, Atlanta, Ga.

Belt, Z. James, No. 601 Market street, Wilmington, Del.

Bendiner, Samuel J., No. 47 Third avenue, New York.

Benedict, James L., Pearl and Church streets, Cleveland, O.

Benedict, Willis, No. 303 Congress avenue, New Haven, Conn.

Benjamin, James H., No. 493 Tompkins avenue, Brooklyn, N. Y.

Berrian, George W., Washington, D. C.

Best, John, No. 1 German Block, Central City, Col.

Betts, Howard S., corner Main and Wall streets, Norwalk, Conn.

Betzler, Jacob, No. 121 Union street, Newark, N. J.

Beyschlag, Charles, Indianapolis, Ind.

Bigelow, Charles F., Evart, Osceola County, Mich.

Bigelow, Israel J., Main street, Dyersville, Iowa.

Billings, Henry M., No. 278 Greenwich street, New York.

Bingham, Charles C., No. 5 Bank Block, Main street, St. Johnsbury, Vt.

Birchard, Abner T., Marshalltown, Iowa.

BIROTH, HENRY, No. 111 Archer avenue, Chicago, Ill.

Bishop, Francis M., Holley, Orleans County, N. Y.

Bissell, Emery G., Main street, Waterville, Oneida County, N. Y.

Bissell, John G., No. 45 Dominick street, Rome, N. Y.

BLACKMAN, LYMAN R., No. 167 Thames street, Newport, R. I.

Blahnik, Lorenz, No. 88 West Eighteenth street, Chicago, Ill.

Blaikie, William, No. 202 Genesee street, Utica, N. Y.

Blair, Andrew, cor. Eighth and Walnut streets, Philadelphia, Pa.

Blair, Henry C., cor. Eighth and Walnut streets, Philadelphia, Pa.

Blake, James E., No. 64 North Second street, New Bedford, Mass.

Blanding, William B., Nos. 54 and 58 Weybosset street, Providence, R. I.

Blank, Alois, No. 1353 South Fifth street, St. Louis, Mo.

Blatchford, Eben, No. 32 Main street, Rockport, Mass.

Blatterman, George W., Denver, Col.

Blocki, William F., No. 85 South Clark street, Chicago, Ill.

Blunt, Ira W., Inner Court, between Eleventh and Twelfth and Main and Cary streets, Richmond, Va.

Bocking, Edmund, No. 1 Odd Fellows' Hall, Wheeling, W. Va.

Bodeker, Henry, cor Fifteenth and East Main streets, Richmond, Va.

Boehm, Solomon, No. 800 Morgan street, St. Louis, Mo.

Boerner, Emil L., Haas Block, Clinton street, Iowa City, Iowa.

Boggs, Edwin L., Kanawha Bank Building, Charleston, Kanawha Co., W. Va.

Bohl, Conrad, Watertown, O.

Bolles, William P., No. 571 Dudley street, Boston, Mass.

Bond, Joseph R., New York.
Booth, Clarence F., No. 278 Greenwich street, New York.
Borell, Henry A., No. 2043 Chestnut street, Philadelphia, Pa.
Boring, Edwin M., cor. Tenth and Fairmount avenue, Philadelphia, Pa.
Borland, Matthew W., No. 378 West Van Buren street, Chicago, Ill.
Borst, George F., No. 440 S. Meridian street, Indianapolis, Ind.
Bower, Henry, cor. Gray's Ferry road and Twenty-ninth street, Philadelphia, Pa.
Bower, Henry A., cor. Sixth and Green streets, Philadelphia, Pa.
Bowker, James, cor. Sixth and Vine streets, Philadelphia, Pa.
Boyce, Samuel F., west side of Public Square, Chillicothe, Mo.
Boyden, Edward C., corner of Joy and Myrtle streets, Boston, Mass.
Boynton, Herschell, No. 74 Main street, Biddeford, Maine.
Brack, Charles, cor. Ensor and Forrest streets, Baltimore, Md.
Brackett, Aurick S., No. 109 Powell street, San Francisco.
Bradfield, L. H., cor. Decatur and Pryor streets, Atlanta, Ga.
Brandon, Joseph F., No. 18 E. Anderson street, Anderson, Ind.
Brant, Edmund W., No. 292 Broad street, Elizabeth, N. J.
Brewer, Percival, Roseville, Ill.
Brewster, Wadsworth J., Hannibal, N. Y.
Bristol, Charles E., No. 48 Main street, Ansonia, Conn.
Brooks, F. M., Baton Rouge, La.
Brooks, George W., No. 1161 Myrtle avenue, Brooklyn, N. Y.
Broughton, Albert J., No. 64 Dominick street, Rome, N. Y.
Brown, Albert P., cor. Fifth and Federal streets, Camden, N. J.
Brown, Charles S., care of A. D. Edwards, Terrell, Texas.
Brown, Henry J., No. 2 Main street, Ann Arbor, Mich.
Brown, Joseph J., Oakland, Cal.
Brown, Robert J., Leavenworth, Kansas.
Browne, Clarence E., No. 39 Harrison avenue, Boston, Mass.
Browning, Woodville, Hopkins, Mo.
Bruce, James, No. 544 Prospect street, Cleveland, O.
Bruguier, Francis, No. 557 Market street, Newark, N. J.
Brunner, Norman I., cor. Fourth and Arch streets, Macon, Ga.
Bryant, William C., Cedar Falls, Black Hawk Co., Ia.
Buchanan, Henry C., north side Main street, Okolona, Miss.
Buck, Albert B., Anderson, Ind.
Buck, George, S. W. cor. State and Madison streets, Chicago, Ill.
Buck, John, Nos. 104 and 106 Winnisimmet street, Chelsea, Mass.
Buehler, Edward H., No. 170 William street, New York.
Buffington, Cyrus A., Hotel Block, Indianola, Ia.
Bullard, George S., No. 98 Genesee street, Utica, N. Y.
Bullock, Charles, No. 528 Arch street, Philadelphia, Pa.
Buntin, William C., No. 600 Main street, Terre Haute, Ind.
Bunting, Samuel S., cor. Tenth and Spruce streets, Philadelphia, Pa.
Burdge, Jacob U., No. 482 Seventh avenue, New York.
Burge, James O, Nashville, Tenn.
Burley, Edwin P., No. 43 Temple Place, Boston, Mass.
Burnett, Joseph, No. 27 Central street, Boston, Mass.
Burnham, Edward S., Charleston, S. C.
Burns, J. Kellar, cor. Sunbury and Lecona streets, Minersville, Pennsylvania.
Burroughs, Silas M., 8 Snow Hill, London, England.
Bury, Edward B., No. 412 Eighth street, S. E., Washington, D. C.
Bush, William, No. 56 Front street, Worcester Mass.
Butler, Freeman H., No. 141 Central street, Lowell, Mass.

Button, Charles E., No. 1558 Wabash avenue, Chicago, Ill.

Cabell, George W., No. 211 Central avenue, Hot Springs, Arkansas.

Caffee, Amos H., Carthage, Mo.

Cahill, John F., No. 119 Main street, Johnstown, N. Y.

Calder, Albert L., No. 163 Westminster street, Providence, R. I.

Caldwell, James W., No. 242 Grand River avenue, Detroit, Mich.

Calvert, John, S. E. cor. Kearny and Clay streets, San Francisco, Cal.

Campbell, Horace W., No. 84 Front street, New York.

Campbell, Hugh, cor. Twenty-first and Locust streets, Philadelphia, Pa.

Campbell, Isaac T., No. 239 West Broadway, Boston, Mass.

Campbell, J. G., Corsicana, Texas.

Campbell, Samuel, No. 1412 Walnut street, Philadelphia, Pa.

Campbell, William P., No. 61 Baltimore street, Cumberland, Md.

Candidus, Philip C., cor. Dauphin and Cedar streets, Mobile, Ala.

Canning, Henry, No. 90 Green street, Boston, Mass.

Corle, John, Jr., No. 153 Water street, New York.

Carleton, Robert M., Somersworth, N. H.

Carrell, Eugene A., Washington street, Morristown, N. J.

Carslake, George M., S. W. cor. Farnsworth and Church streets, Bordentown, N. J.

Carter, Solomon, No. 355 Washington street, Boston, Mass.

Casper, Thomas J., No. 41 East Main street, Springfield, O.

Casselbeer, Henry A., No. 57 Fourth avenue, New York.

Casselbeer, Henry A., Jr., No. 292 Sixth avenue, New York.

Catlin, Ephron, cor. Sixth street and Washington avenue, St. Louis, Mo.

Chamberlain, Guilford T., N. E. cor. Ninth and Chambers streets, St. Louis, Mo.

Chance, Samuel, Saint Paris, O.

Chandler, Charles F., cor. Fourth avenue and Fiftieth street, New York.

Chapin, William A., cor. Beach and Lincoln streets, Boston, Mass.

Chapman, Garrett A., Atchison, Kansas.

Chapman, Isaac C., No. 111 Water street, Newburgh, N. Y.

Chase, Charles D., No. 7 Gold street, New York.

Chase, John B., Aurora, Ill.

Cherry, James B., No. 23 Fourth avenue, Pittsburgh, Pa.

Choate, John, No. 208 Main street, Fitchburg, Mass.

Christiani, Charles, No. 484 Pennsylvania avenue, Washington, D. C.

Clark, Albert B., Jr., No. 9 Main street, Galesburg, Ill.

Clark, Frank P., North Baltimore, Wood Co., O.

Clarke, William B., Stockbridge, Mass.

Clement, Henry B., Nos. 681 and 686 Broadway, Albany, N. Y.

Close, George C., cor. Smith and Schermerhorn streets, Brooklyn, N. Y.

Coblentz, Virgil, No. 167 West Main street, Springfield, O.

Coffin, Samuel L., No. 90 Wisconsin street, Milwaukee, Wis.

Colby, Albert L., No. 66 East One Hundred and Twenty-seventh street, New York.

Colcord, Jonathan M., Saratoga, N. Y.

Colcord, Joseph W., No. 153 Union street, Lynn, Mass.

Colcord, Samuel M., Dover, Mass.

Colgan, John, cor. Tenth and Walnut streets, Louisville, Ky.

Collins, Albert B., No. 48 Main street, Westerly, R. I.

Collins, Louis D., No. 290 Greenwich street, New York.

Colton, James B., No. 766 Tremont street, Boston, Mass.

Cone, John W., No. 48 North Main street, Providence, R. I.

Congdon, Albert J., Main street, East Greenwich, R. I.

Conner, Jefferson S., No. 121 Pearl street, New Albany, Ind.

Conrath, Adam, No. 1330 State street, Milwaukee, Wis.

Cook, George E., No. 111 Pike street, Port Jervis, N. Y.

Cook, Thomas P., No. 838 North Ninth street, Philadelphia, Pa.

Cool, J. Harris, Main street, Palmyra, N. Y.

Coon, James V. D., No. 81 Union street, Olean, N. Y.

Cordon, John G. M., Main street, Tarboro, N. C.

Cornell, Edward A., cor. Pine and Tenth streets, Williamsport, Pa.

Courtney, William T., Rudd's Block, Ann street, Owensboro, Ky.

Covell, Thomas J., Marshalltown, Ia.

Cowdin, George H., No. 25 Union Square, Somerville, Mass.

Cowdrey, Robert H., No. 527 State street, cor. Harmon court, Chicago, Ill.

Cramer, Max, No. 1336 Tremont street, Boston, Mass.

Crawford, R. W., Fort Dodge, Ia.

Crawford, William H., No. 800 Washington avenue, St. Louis, Mo.

Cressler, Charles H., S. W. cor. Front and Main streets, Chambersburg, Pa.

Creuse, Jules L. A., No. 36 Beekman street, New York.

Cromwell, Zachariah S., No. 480 Pennsylvania avenue, Washington, D. C.

Crossman, George A., No. 2 Simonds's Block, Brandon, Vt.

Cummings, Henry T., No. 696 Congress street, Portland, Me.

Cummings, Theodore F., Scottdale, Westmoreland Co., Pa.

Currie, John H., No. 206 East Twenty-ninth street, New York.

Curry, Daniel W., Odeon Hall Building, Cartersville, Ga.

Curtiss, Charles G., No. 833 De Kalb avenue, Brooklyn, N. Y.

Curtman, Charles O., No. 3718 North Ninth street, St. Louis, Mo.

CUTLER, EDWARD WALDO, No. 89 Broad street, Boston, Mass.

Cutts, Foxwell C., Jr., No. 965 Fulton street, Brooklyn, N. Y.

Dadd, John A., No. 221 Grand avenue, Milwaukee, Wis.

Dale, William M., cor. Clark and Madison streets, Chicago, Ill.

Dalrymple, Charles H., Washington street, Morristown, N. J.

Dana, Edmund, Jr., No. 373 Congress street, Portland, Me.

Danforth, Edmund C., No. 75 Randall street, Providence, R. I.

Daniels, Samuel O., cor. Main and Summer streets, Natick, Mass.

Darlington, James A., No. 326 Clinton street, Buffalo, N. Y.

Davenport, Bennett F., No. 751 Tremont street, Boston, Mass.

Davis, Benjamin, No. 466 Grand street, New York.

Davis, Edward H., Rochester, New York.

Davis, Edward L., cor. Union and Bates streets, Schenectady, N. Y.

Davis, Josiah B., Beaufort, N. C.

Davis, Vincent, cor. Sixth and Chestnut streets, Louisville, Ky.

Davis, William M., No. 689 De Kalb avenue, Brooklyn, N. Y.

Dawson, Edward S., Jr., No. 13 South Salina street, Syracuse, N. Y.

Dawson, John H., Twenty-third and Valencia streets, San Francisco, Cal.

Day, Carlos E., No. 1002 Broadway, Brooklyn, N. Y.

Daycock, William H., No. 649 Bedford avenue, Brooklyn, N. Y.

De Con, James C., No. 44 E. State street, Trenton, N. J.

De Forrest, William P., Fifth avenue cor. Dean street, Brooklyn, N. Y.

De Graff, David, Nyack, Rockland Co., N. Y. (No. 3 Broadway).

De Puy, Casper E., N. W. cor. Main and Middle streets, Chelsea, Michigan.

Dearborn, George L., No. 156 Main street, New Market, N. H.

Deibert, Thomas I., No. 103 North Centre street, Pottsville, Pa.

Delavallade, Jean M., cor. Bank and Plaquemine streets, Plaquemine, Louisiana.

Delery, Edgar, P. O. Box 19, Bay St. Louis, Miss.

Denham, Charles S., Main street, Rockland, Mass.

Dennin, Charles, No. 33 Court street, Brooklyn, N. Y.

Dick, Dundas, No. 37 Wooster street, N. Y.

Diehl, C. Lewis, cor. Third and Broadway, Louisville, Ky.

Dieterich, William A., No. 756 Tenth avenue, New York.

Dikeman, Nathan, cor. Leavenworth and Dikeman streets, Waterbury, Ct.

Dill, J. B., Indianapolis, Ind.

Dinsmore, George F., No. 41 Park street, Worcester, Mass.

Ditman, Andrew J., No. 10 Astor House, New York.

Dobbins, Edward T., No. 1412 Walnut street, Philadelphia, Pa.

Dohme, Charles E., cor. Pratt and Howard streets, Baltimore, Md.

Dohme, Louis, cor. Pratt and Howard streets, Baltimore, Md.

Dolber, Thomas, No. 39 Tremont street, Boston, Mass.

Dougherty, Samuel E., No. 65 Brinkerhoff street, Jersey City, N. J.

Douglass, Henry, Jr., No. 68 Wythe avenue, Brooklyn, N. Y.

Drake, Charles W., No. 275 Main street, Middleboro, Mass.

Drake, Jonathan B., No. 132 Broad street, Elizabeth, N. J.

Drake, John R., No. 255 S. Water street, Milwaukee, Wis.

Drake, Robert S., station 6, Elleandville, St. Louis, Mo.

Drets, Charles A., No. 166 Broadway, Buffalo, N. Y.

Dreher, Ernest, No. 953 Broad street, Newark, N. J.

Dreher, Louis, No. 302 Euclid avenue, Cleveland, O.

Drew, John W., No. 901 Pennsylvania avenue, Washington, D. C.

Driggs, Charles M., White Haven, Pa.

Driggs, Nathaniel S., Indianapolis, Ind.

Drischler, Francis, No. 755 Ninth avenue, New York.

Drury, Linus D., cor. Warren and Dudley streets, Boston, Mass.

Duble, Jesse B., cor. Pan and Fourth streets, Williamsport, Pa.

Du Bois, William L., No. 281 Main street, Catskill, N. Y.

Duckett, Walter G., cor. Twenty-second street and Pennsylvania avenue, Washington, D. C.

Dudley, Oscar E., No. 62 E. One Hundred and Twenty-fifth st., Brooklyn, N. Y.

Dufour, Clarence R., No. 1814 Fourteenth street, Washington, D. C.

Dung, Albert C., No. 61 Bowery, N. Y.

Dunn, John A., No. 56 Dougherty street, Brooklyn, N. Y.

Dupuy, Eugene, Soldiers' and Sailors' Home, Bath, Steuben Co., N. Y.

Duryee, George E., No. 191 State street, Schenectady, N. Y.

Dykeman, George A., Catskill, N. Y.

Eareckson, Edwin, cor. Baltimore and High streets, Baltimore, Md.

Earnshaw, William J., No. 38 Huron street, Indianapolis, Ind.

Eastman, Charles S., N. E. cor. Main and Depot streets, Concord, N. H.

Easton, Luther W., Union near Webster street, Rockland, Mass.

Eberbach, Ottmar, No. 12 South Main street, Ann Arbor, Mich.

Eberle, Charles L., No. 4779 Germantown avenue, Philadelphia, Pa.

Eberle, Herman T., care G. E. Eberle & Son, Watertown, Wis.

Ebert, Albert E., Peoria Sugar Refinery, Peoria, Ill.

Eckel, Augustus W., No. 2[illegible]1 King street, Charleston, S. C.

Eddy, Henry C., cor. Eighteenth and Lombard streets, Philadelphia, Pa.

Eddy, Charles H., Main street, Great Barrington, Mass.

Edmonds, Augustus R., Miami, Saline Co., Mo.

Edwards, Nathan W., Main street, Fairmount, Ind.

Eger, George, Nos. 8[illegible]9 and 841 Central avenue, Cincinnati, O.

Eggers, Frederick H., No. 72 Ohio street, Allegheny City, Pa.

Eimer, Charles, No. 205 Third avenue New York.
Eisele, Martin A., Hot Springs, Ark.
Elbe, Constantine B., Webster street and Santa Clara avenue, Alameda, California.
Eldridge, George W., cor. Seventh and Thompson streets, Philadelphia, Pa.
Elfers, Joseph C., No. 42 Budd street, Cincinnati, O.
Eliel, Leo, South Bend, Ind.
Elliott, Henry A., No. 286 Lexington street, Baltimore, Md.
Ellis, Evan T., No. 133 South Front-street, Philadelphia, Pa.
Emanuel, Louis, cor. Second and Grant streets, Pittsburgh, Pa.
Emich, Columbus V., No. 136 North Howard street, Baltimore, Md.
England, Robert, No. 800 South Tenth street, Philadelphia, Pa.
Ennis, W. W., Main and Market streets, Ottumwa, Ia.
Entwisle, William B., No. 1201 Pennsylvania avenue, Washington, D. C.
Eschmann, F. W. R., No. 10 College Place, New York.
Estes, Joseph, cor. Union and Church streets, Rockland, Mass.
Estey, Edwin M., Moncton, New Brunswick.
Evans, Henry S., Montreal, Canada.
Evans, Hugh W., Delphos, O.
Evans, Joseph S., P. O. Box 657, West Chester, Pa.
Evans, Samuel B., Circleville, O.
Fairchild, Benjamin T., No. 60 Fulton street, New York.
Faust, Charles, S. E. cor. Elm and Liberty streets, Cincinnati, O.
Featherston'h, Edward R., No. 1203 Chouttan avenue, St. Louis, Mo.
Feemster, Joseph H., No. 99 Walnut street, Cincinnati, O.
Feeny, James, Bay and Thompson streets, Stapleton, S. I., N. Y.
Fennel, Adolphus, cor. Eighth and Vine streets, Cincinnati, O.
Fenner, William R., care of W. D. Hoyt & Co., Rome, Ga.
Fenton, Frank S., Beloit, Wis.
Ferdinand, George A., Dubuque, Ia.
Ferguson, Robert B., cor. Second street and Pennsylvania avenue, Washington. D. C.
Ferris, Charles E., Lawrenceburg, Ind.
Feth, Joseph G., cor. Madison and Columbia streets, Newport, Ky.
Field, Amos, No. 26 Vine street, Macon, Mo.
Finkel, Charles E., No. 4 Main street, Yonkers, N. Y.
Fischer, Edward J., No. 570 Sedgwick street, Chicago, Ill.
Fish, Charles F., No. 104 Broadway, Saratoga Springs, N. Y.
Fisher, Amos S., Bergen, N. Y.
Fisher, William, No. 327 Bleeker street, New York.
Flanagan, Lewis C., No. 589 Somerville avenue, Somerville, Mass.
Flint, John H., Marysville, Cal.
Foland, Daniel J., Wilmington, O.
Follansbee, Sherman, Dedham, Mass.
Ford, James M., Kansas City, Mo.
Ford, W. Thomas, No. 1305 Cherry street, Kansas City, Mo.
Foster, William O., Simcoe, Ontario, Can.
Fongera, C. Edmund, cor. Broadway and Thirtieth street, New York.
Foulke, James, No. 250 Washington street, Jersey City, N. J.
Fox, Daniel S., cor. State and Madison streets, Chicago, Ill.
Fox, Peter P., No. 2300 Spruce street, Philadelphia, Pa.
Frames, James P., cor. Gay and Aisquith street, Baltimore, Md.
Francis, Walter R., No. 170 Orange street, New Haven, Conn.
Franklin, Philip H., Marshall, Mo.
Fraser, Edward A., No. 20 College Place, New York.
Frauer, Herman E., No. 246 East Washington street, Indianapolis, Ind.
Frazee, George B., No. 69 Main street, Columbus, Miss.
French, George W., No. 360 Washington street, Boston, Mass.
French, William B , No. 70 State street, Albany, N. Y.

Frere, Alexander G., Main street, Franklin, La.

Frey, John, Bellevue Hospital, New York.

Fridenberg, Eugene L., No. 459 West Twenty-third street, New York.

Frisby, Frank, Atchison, Kansas.

Frohwein, Richard, No. 122 First street, Elizabethport, N. J.

Frohwein, Theobald, No. 218 Stanton street, New York.

Frost, James, Nos. 169, 171, 173 Georgia street, Vallejo, Solano County, Cal.

Frothingham, Edward G., Jr., Elm street, cor. Main and Water, Haverhill, Mass.

Früh, Carl D. S., No. 2321 Ridge avenue, Philadelphia, Pa.

Frye, George G., No. 320 Congress street, Portland, Me.

Fuller, Henry W., No. 220 Randolph street, Chicago, Ill.

Fuller, Oliver F., No. 220 Randolph street, Chicago, Ill.

Gaillard, Edward, No. 1802 North Eleventh street, Philadelphia, Pa.

Gale, Elwin O., No. 85 South Clark street, Chicago, Ill.

Gale, William H., No. 85 South Clark street, Chicago, Ill.

Gallagher, Charles K., Second street, Washington, N. C.

Gallagher, John A., Kansas City, Mo.

Gardner, Charles H., New York.

Gardner, Robert W., New York.

Garrett, Oscar A., Cameron, Mo.

Garrett, Samuel S., Derby Block, North Water street, East Saginaw, Mich.

Garrison, Herod D., No. 3510 Vincennes avenue, Chicago, Ill.

Gates, Howard F., Litchfield, Conn.

Gates, Amasa O., Morrisville, Vt.

Gans, Charles H., No. 202 Washington avenue, Albany, N. Y.

Gans, Louis H., No. 254 South Pearl street, Albany, N. Y.

Gaylord, Henry C., No. 110 Monument square, Cleveland, O.

Gegelman, Frederick L., Payne and Case avenues, Cleveland, O.

Geier, Oscar W., No. 175 Main street, Carrollton, Ky.

Gellatly, William A., No. 170 William street, New York.

Genois, Louis, No. 1412 Walnut street, Philadelphia, Pa.

George, Charles T., No. 1306 North Third street, Harrisburg, Pa.

Gerhard, Samuel, corner Hanover and Belgrade streets, Philadelphia, Pa.

Gessner, Emil A., No. 301 Chapel street, New Haven, Conn.

Gibson, Charles, No. 74 State street, Albany, N. Y.

Gibson, William A., No. 580 King street, Charleston, S. C.

Gill, George, P. O. Box 17, Mount Vernon, N. Y.

Gilmore, John W., Third avenue, cor. One Hundred and Thirty-eighth street, New York.

Girling, Robert N., P. O. Box 1310, New Orleans, La.

Giroux, Edmond, No. 52 St. Peter street, Quebec, Can.

Glines, George W., No. 147 Franklin avenue, Cleveland, O.

Godding, John G., corner Berkeley and Boylston streets, Boston, Mass.

Good, James M., No. 2348 Olive street, St. Louis, Mo.

Goodale, Harvey G., No. 207 Atlantic avenue, Brooklyn, N. Y.

Goodale, Thomas T., No. 30 Tremont street, Boston, Mass.

Goodman, Charles F., No. 180 Farnham street, Omaha, Neb.

Goodman, Emanuel, corner Sixth and Elm streets, Cincinnati, O.

Goodrich, Stephen, care of L. G. Moses & Co., Hartford, Conn.

Goodwin, Lester H., cor. State and Main streets, Hartford, Conn.

Gordon, William J. M., No. 142 Walnut street, Cincinnati, O.

Gorham, John R., Jr., No. 79 Water street, Newburgh, N. Y.

Gosman, Adam J., cor. Charles and Mulberry streets, Baltimore, Md.

Graham, William A., No. [illegible] Columbus avenue, Sandusky, O.

Graham, Willis H., No. 144 Main street, Zanesville, O.

Grahame, Israel J., cor. Twelfth and Filbert streets, Philadelphia, Pa.

Grandjean, Charles, No. 2828 North Fourteenth street, St. Louis, Mo.

Grandjean, Eugene, No. 2828 North Fourteenth street, St. Louis, Mo.

Gray, Gilbert D., Glenwood, Mo.

Gray, Henry R., No. 144 St. Lawrence Main street, Montreal, Quebec, Canada.

Gray, William Howlett, No. 1139 Market street, Wheeling, W. Va.

Gregory, Edmund, Kent street, Lindsay, Ontario, Canada.

Greve, Theodore L. A., cor. John and Sixth streets, Cincinnati, O.

Greyer, Julius, S. W. cor. Vine and Findlay streets, Cincinnati, O.

Gridley, Junius, No. 87 Maiden lane, New York.

Grieve, Fleming G., Lunatic Asylum, Milledgeville, Ga.

Griffith, Albert R., No. 33 Centre street, Oil City, Pa.

Griffith, Alphonzo De L., No. 33 Centre street, Oil City, Pa.

Griffith, Hiram E., Grant's Block, Niagara Falls, N. Y.

Griffith, William H., No. 146 Second avenue, New York.

Griswold, De Witt C., Evansville, Wisconsin.

Groff, John E., care Caswell, Massey & Co., Newport, R. I.

Grossklauss, John F., cor. High street and Public Square, Navarre, O.

Grosvenor, Daniel P., Jr., No. 35 Main street, Peabody, Mass.

Grove, John E., No. 3326 Germantown avenue, Philadelphia, Pa.

Gundrum, George, Ionia, Mich.

Haag, Julius A., Denison House, Indianapolis, Ind.

Haass, G. Herman, No. 38 East Main street, Rochester, N. Y.

Haber, Louis A., No. 283 St. Clair street, Cleveland, O.

Hadley, Frank R., No. 64 North Second street, New Bedford, Mass.

Haenchen, Charles E., No. 3838 Haverford street, Philadelphia, Pa.

Hageman, James F. S., Washington street, New Madison, Darke Co., O.

Haight, William B., care Lockwood & Haight, Bogardus, Stamford, Conn.

Hair, James, P. O. Box 879, Wilkesbarre, Pa.

Hale, Frederick, Brooklyn, N. Y.

Hall, Edwin B., Wellsville, Allegheny County, N. Y.

Hall, Marshall C., care Hall Brothers, Fredericksburg, Va.

Hallberg, Carl S. N., No. 25 Michigan avenue, Chicago, Ill.

Hamilton, Emil, No. 3037 Indiana avenue, Chicago, Ill.

Hance, Edward H., cor. Callowhill and Marshall streets, Philadelphia, Pa.

Hancock, Charles W., No. 3425 Spring Garden street, Philadelphia, Pa.

Hancock, John F., cor. Baltimore and Caroline streets, Baltimore, Md.

Hancock, John Henry, care of Reed & Carnick, New York city.

Hanson, Dominicus, Central Square, Rochester, N. Y.

Hanson, Willis T., No. 195 State street, Schenectady, N. Y.

Harbers, William H., Laurens street, Aiken, S. C.

Hardigg, William L., Second near Main streets, Uniontown, Ky.

Hardin, John H., Wilmington, N. C.

Hardy, William H., Clinton, Iowa.

Harlow, Noah S., No. 4 Smith's Block, Bangor, Me.

Harlow, Wickham N., No. 219 Main street, Orange, N. J.

Harner, James M., New York.

Harper, Frank M., No. 45 East Main street, Madison, Ind.

Harper, Harry W., Fort Worth, Texas.

Harries, Oscar L., No. 263 Washington street, Buffalo, N. Y.

Harrington, Frank, Werland's Block, Main street, Logan, O.

Hartness, William H., No. 109 Ontario street, Cleveland, O.

Hartshorn, Frederick A., Marlborough, Mass.

Hartung, Hugo R., No. 230 Fifteenth street, Denver, Colorado.

Hartwig, Charles F., Chicago, Ill.

Harvey, Edmund, P. O. Box 657, Guelph, Ontario, Canada.

Harwood, Frank L., Main street, Warren, Mass.

Harwood, Lucien, Main street, Warren, Mass.

Hassencamp, Ferdinand, No. 75 Hanover street, Baltimore, Md.

Hassinger, Samuel E. R., N. E. cor. Fairmount avenue and Twenty-third street, Philadelphia, Pa.

Hattenhauer, Robert C., Peru, La Salle Co., Ill.

Hatton, Edgar M., cor. Main and Fifth streets, Zanesville, O.

Hartland, Henry, New York.

Hawkins, Henry, cor. Hastings and Brewster streets, Detroit, Mich.

Hawkins, Joseph T., N. W. cor. Dearborn and Minor streets, Mobile, Alabama.

Hawkins, M. Smith, No. 20 Broadway, Salem, Columbiana Co., O.

Hay, Henry H., cor. Free and Middle streets, Portland, Me.

Hayes, Horace P., No. 312 Elk street, Buffalo, N. Y.

Hays, David, No. 207 Division street, New York city.

Hazen, Peter P., Cornwall, Orange Co., N. Y.

Hazlett, Edward E., S. E. cor. Norris and Mervine streets, Philadelphia, Pa.

Heagy, Weems A., Harrison street, Alexandria, Ind.

Hebberling, Gottfried, No. 695 Seventh street, New York.

Hechler, George L., No. 774 Broadway, Cleveland, O.

Hegeman, J. Niven, No. 756 Broadway, New York city.

Heimstreet, Edward B., care of S. Heimstreet & Son, Janesville, Wis.

Heinemann, Otto, cor. Laurel and Lynn streets, Cincinnati, O.

Heinitsh, Charles A., No. 16 East King street, Lancaster, Pa.

Heintzelman, Joseph A., cor. Ridge avenue and Master street, Philadelphia, Pa.

Helman, Charles M., cor. Findlay and Baymiller streets, Cincinnati, O.

Hemm, Francis, South St. Louis, Missouri.

Henderson, John, Toronto, Canada.

Henes, William F., No. 1620 Third avenue, New York.

Heinrich, George, cor. Mill and Jefferson streets, Mascoutah, Ill.

Henry, Charles (Dworniczak), Croton Landing, N. Y.

Hepburn, John, No. 93 Main street, Flushing, N. Y.

Herbruger, Florence C., Guatemala, U. S. of Colombia.

Herbst, Frederick W., Columbus, O.

Hermann, John George, cor. Baltimore and Mechanic streets, Cumberland, Md.

Hessen, G. A., No. 220 Poplar street, Memphis, Tenn.

Heuermann, Henry W., No. 120½ Claiborne avenue, Chicago, Ill.

Heun, Emil, Cincinnati, O.

Heydenreich, Emile, No. 169 Atlantic avenue, Brooklyn, N. Y.

Heyl, James B., Vice-Consul, Hamilton, Bermuda.

Higgins, Albert W., No. 41 Merchants' Row, Rutland, Vt.

Higgins, James S., No. 21 De Lancey street, New York.

Hildreth, Charles F., No. 54 Main street, Suncook, N. H.

Hildreth, Newton G., Cheviot, Cincinnati, O.

Hill, J. W. H., Saugus, Mass.

Hilt, David, No. 84 Main street, Lafayette, Ind.

Hinsdale, Samuel J., Market Square, Fayetteville, N. C.

Hobart, Charles H., No. 10 Gold street, New York city.

Hodgetts, George, No. 305 Yonge street, Toronto, Canada.

Hoffmann, Frederick, No. 64 Ann street, New York.

Hogan, Louis C., cor. Forty-seventh and State streets, Chicago, Ill.

Hogey, Julius H., No. 441 State street, Chicago, Ill.

Hogin, George B., Newton, Ia.

Hohenthal, Charles F. L., No. 857 Third avenue, New York.

Hohly, Charles, No. 248 South St. Clair street, Toledo, O.

Holland, Samuel P., cor. Smithfield and Liberty streets, Pittsburgh, Pa.

Holmes, Clayton W., No. 122 Lake street, Elmira, N. Y.

Holmes, Henry E., No. 19 Main street, Walla-Walla, Washington Territory.

Holzhauer, Charles, No. 787 Broad street, Newark, N. J.

Hood, Charles I., cor. Merrimac and Central streets, Lowell, Mass.

Hopp, Lewis C., cor. Euclid avenue and Erie street, Cleveland, O.

Hopper, George E., Hume, Allegheny Co., N. Y.

Horn, Wilbur F., No. 32 West Main street, Carlisle, Pa.

Hoskinson, J. Thomas, Jr., Front and Norris streets, Philadelphia, Pa.

Hostetter, Charles M., No. 272 Penn avenue, Pittsburgh, Pa.

Hottendorf, Augustus, cor. Central avenue and Baymiller street, Cincinnati, O.

Howson, Walter H., Water street, Chillicothe, O.

Hoyt, George M., No. 61 Warren street, Boston, Mass.

Huber, Jacob C., No. 450 Main street, Fond du Lac, Wis.

Hubbard, George J., Manchester, New Hampshire.

Hubbard, John H., No. 468 Harvard street, Cambridge, Mass.

Huddart, John F., Second and Chestnut streets, Louisville, Ky.

Hudnut, Alexander, No. 218 Broadway, New York.

Hudson, Arthur, Centre street, Newton, Mass.

Huested, Alfred B., No. 77 Eagle street, Albany, N. Y.

Hughes, Benjamin L., cor. Lama and Duval streets, Jacksonville, Fla.

Huling, Bruce, No. 109 Ontario street, Cleveland, O.

Hunt, James L., cor. North and Main streets, Hingham, Mass.

Hunt, Leonard W., Fourth street, Macon, Ga.

Hurley, John, Monroe street, Little Falls, Herkimer Co., N. Y.

Hurst, John C., No. 936 Market street, Philadelphia, Pa.

Hurt, James F., Broadway, Columbia, Mo.

Hurty, John N., No. 104 North Penn street, Indianapolis, Ind.

Huston, Charles, No. 43 South High street, Columbus, O.

Hutchins, Isaiah, M.D., West Acton, Mass.

Hyler, William H., No. 99 Main street, Port Chester, N. Y.

Ihlefeld, Conrad H., No. 715 Eighth avenue, New York.

Imgard, Julius, No. 586 Sixth avenue, New York.

Ingalls, John, cor. Fourth and Poplar streets, Macon, Ga.

Inloes, A. J., Binghamton, N. Y.

Inness, George, No. 45 University Place, New York.

Irvin, William A., Public Square, Kokoma, Ind.

Jackson, Vincent R., cor. Gilman and Stewart streets, Baltimore, Md.

Jacobs, Joseph, Clayton street, Athens, Ga.

Jacobus, Judson S., cor. Thirty-first street and Indiana avenue, Chicago, Ill.

Jacques, George W., cor. Broadway and Augusta street, S. Amboy, New Jersey.

James, George R., No. 120 Grand street, Schoolcraft, Mich.

James, William T., No. 103 Main street, Flushing, N. Y.

Jefferson, John H. B., No. 96 South Broadway, Baltimore, Md.

Jenkins, Luther L., No. 119 Leverett street, Boston, Mass.

Jenks, Thomas L., Merriman and Traverse streets, Boston, Mass.

Jenks, William J., No. 160 North Third street, Philadelphia, Pa.

Jennings, N. Hynson, No. 90 North Charles Street, Baltimore, Md.

Jesson, Jacob, cor. Western avenue and Jefferson street, Muskegon, Mich.

Johnson, Benjamin F., No. 301 East Girard avenue, Philadelphia, Pa.

Johnson, Charles B., Third street, Middletown, O.

Johnson, Edward L., Tenth avenue cor. One Hundred and Fifty-seventh street, New York.

Johnson, Horace J., 1 Rumford Building, Main street, Waltham, Mass.

Johnson, Stuart W., Toronto, Ontario, Canada.

Johnston, William, Nos. 153 and 155 Jefferson avenue, Detroit, Mich.

Jones, Alexander H., Ninth and Parrish streets, Philadelphia, Pa.

Jones, Charles K., Leffingwell and Washington avenue, St. Louis, Mo.

Jones, Daniel S., Twelfth and Spruce streets, Philadelphia, Pa.

Jones, Edward C., S. E. cor. Fifteenth and Market streets, Philadelphia, Pa.

Jones, James T., No. 855 East Fourth street, Boston, Mass.

Jones, John R., Mankato, Minn.

Jones, Simon N., First and Jefferson streets, Louisville, Ky.

Jones, Thomas, Nos. 1060 and 1062 Fulton street, Brooklyn, N. Y.

Jordan, F. Francis, Court-house Square, Goderich, Canada.

Jordan, William H., No. 653 Congress street, Portland, Me.

Joy, Edwin W., Post and Mason streets, San Francisco, Cal.

Judge, John F., near cor. Court and Cutter streets, Cincinnati, O.

Jungmann, Julius, New York city

Kadlec, Lawrence W., No. 136 W. Twelfth street, Chicago, Ill.

Kalb, Theodore, Second and Poplar streets, St. Louis, Mo.

Kalish, Julius, No. 409 Grand street, New York.

Kannal, Emmet, Rensselaer, Ind.

Karch, Joseph L., Ninth and Cumberland streets, Lebanon, Pa.

Karrman, William, Cincinnati, O.

Kauffman, George B., No. 47 East Spring street, Columbus, O.

Kay, Isaac H., No. 1101 Arch street, Philadelphia, Pa.

Keasby, Henry G., No. 332 North Front street, Philadelphia, Pa.

Keeler, William H., P. O. Box 585, Saginaw City, Mich.

Keeney, Caleb R., Sixteenth and Arch streets, Philadelphia, Pa.

Keiper, Louis, No. 780 Lorain street, Cleveland, O.

Kelley, Edward S., Boylston and Berkeley streets Boston, Mass.

Kellog, Gardner, Mill and Commercial streets, Seattle, Washington Territory.

Kelly, George A., Pittsburgh, Pa.

Kelsey, Henry J., No. 37 Grove street, New Haven, Conn.

Kennedy, George W., No. 103 North Centre street, Pottsville, Pa.

Kennedy, Thomas, Broadway, New Brighton, Pa.

Kent, Henry A., Jr., cor. E. Broad street and Jefferson avenue, Elizabeth, N. J.

Kent, Robert R., No. 7 Winthrop Block, Boston, Mass.

Keppler, Christian L., No. 461 Dryades street, New Orleans, La.

Kerr, James, Sr., No., 56 Springfield street, Pittsburgh, Pa.

Kessler, Edward F., cor. Twentieth and Market streets, Louisville, Ky.

Keys, Roger, Twelfth and Pine streets, Philadelphia, Pa.

Kidder, Samuel, Jr., No. 38 Nesmith street, Lowell, Mass.

Kielhorn, Henry, cor. Ash street and Christian avenue, Indianapolis, Indiana.

Kimmel, Henry, No. 65 Avenue A, New York.

King, James T., Main and South streets Middletown, N. Y.

Kirchhofer, P. Paul, Massillon, Stark Co., O.

Kitchen, Charles W. cor. Fulton and Washington streets, Brooklyn, N. Y.

Klie, G. H. Charles, Bellefontaine road, Lowell, N. St. Louis, Mo.

Kline, Mahlon N., Nos. 309 and 311 North Third street, Philadelphia, Pa.

Klump, Charles C., Allentown, Lehigh County, Pa.

Klussmann Hermann, corner Fourth street and Lafayette avenue, Hoboken, N. J.

Knabe, Gus. A., No. 484 Pennsylvania avenue, Washington, D. C.

Knapp, Frank F., No. 362 Hudson street, New York.

Knight, George E., No. 12 Liberty street, Bath, N. Y.

Knock, Thomas F., Petersburg, Va.

Knoebel, Edmund, Public Square, Highland, Ill.

Knoefel, August, New Albany, .nd.

Knowles, Henry A., No. 463 Yonge street, Toronto, Can.

Koch, Louis, corner Fourth and Wood streets, Philadelphia, Pa.

Koehnken, Herman H., corner Third and Mill streets, Cincinnati, O.

Krehbiel, Gustavus, No. 156 East Forty-eighth street, New York.

Krewson, William E., cor. Eighth and Montgomery streets, Philadelphia, Pa.

Krieger, Philip, cor. Myrtle and Marcey streets, Brooklyn, N. Y.

Krusemarck, Charles, corner Twenty-second street and Indiana avenue, Chicago, Ill.

Kuerze, Robert M., N. W. cor. Eighth and Depot streets, Cincinnati, O.

Kuhn, Norman A., No. 124 South Fifteenth street, Omaha, Neb.

Kurfurst, Henry F., West Liberty, Logan County, O.

Laber, Julius, No. 874 Third avenue, New York.

Lahme, Charles A., Kansas City, Mo.

Laird, William R., No. 250 Washington street, Jersey City, N. J.

Lambert, John A., No. 450 West Michigan street, Indianapolis, Ind.

Lammert, C. Joseph, No. 32 Milton street, Cincinnati, O.

Land, Robert H., No. 270 Broad street, Augusta, Ga.

Lander, John C., Yorkville, Toronto, Can.

Lattimer, Robert F., No. 74 Elm street, Westerly, R. I.

Lauer, Michael J., No. 275 Mulberry street, Baltimore, Md.

Laurent, Eugene L., No. 27 Cedar street, Nashville, Tenn.

Lautenbach, Robert, cor. Eutaw and Saratoga streets, Baltimore, Md.

Lawton, Charles H., No. 91 Union street, New Bedford, Mass.

Lawton, Horace A., No. 91 Union street, New Bedford, Mass.

Laycock, Washington, No. 44 Union avenue, Rondout, N. Y.

Lazell, Lewis T., No. 10 Gold street, New York.

Leary, Jeremiah T., No. 239 West Broadway, Boston, Mass.

Lee, James A., Main street, New Iberia, La.

Lee, James H., Court Square, Ashville, N. C.

Lehlbach, Paul F., No. 482 West Twenty-second street, New York.

Lehn, Louis, No. 160 William street, New York.

Leis, George, No. 90 Massachusetts street, Lawrence, Kan.

Leist, Jacob L., Napoleon, O.

Leitch, Arthur, care of E. Shendell, St. Louis, Mo.

Lemberger, Joseph L., No. 8 North Ninth street, Lebanon, Pa.

Lengfeld, Abraham L., cor. Gay and Stockton streets, San Francisco, Cal.

Levy, Adolph, No. 125 Grand street, E. D., Brooklyn, N. Y.

Lewis, Elam C., No. 2 West, corner Merchants' Row, Rutland, Vt.

Lewis, Samuel E., Fourteenth and P streets, N. W., Washington, D. C.

Libby, Henry T., Main street, Pittsfield, Me.

Lillie, Charles H., Main street, Great Barrington, Mass.

Lilly, Eli, No. 36 South Meridian street, Indianapolis, Ind.

Lincoln, Henry W., No. 185 Warren street, Boston, Mass.

Linden, Hugo F., Superior and Broad streets, Cleveland, O.

Linn, William B., cor. Waverly Place and Christopher street, Northern Dispensary, New York city.

Lins, Albert H., No. 86 Second avenue, New York.

Little, James, Harrisonburg, Va.

Livingston, Barent V. B., No. 306 Broadway, Brooklyn, N. Y.

Llewellyn, John F., west side Public square, Mexico, Adrian County, Mo.

Lloyd, John U., corner Court and Plum streets, Cincinnati, O.

Lobstein, S. F. Daniel, Main street, Sag Harbor, N. Y.

Lockwood, Samuel A., cor. Broad and White streets, Red Bank, Monmouth County, N. J.

Lohman, George H., No. 1 Mitchell's Block, Kendallville, Ind.

Loomis, John C., corner Chestnut and Wall streets, Jeffersonville, Ind.

Lord, Thomas, No. 72 Wabash avenue, Chicago, Ill.

Love, Charles E., No. 544 Main street, Kansas City, Mo.

Loveland, William F., No. 213 Bread street, Elizabeth, N. J.

Lowd, John C., No. 43 Temple Place, Boston, Mass.

Lowden, John, No. 18 De Breseles street, Toronto, Can.

Luce, Edgar H. No. 61 Warren street, Boston, Mass.

Luckenback, Edward H., No. 3 Broad street, Bethlehem, Pa.

Ludlow, Charles, No. 55 East Main street, Springfield, O.

Luhn, Gustavus J., P. O. Box 582, Charleston, S. C.

Lull, George E., Manchester, N. H.

Luscomb, Will. E., No. 310 Essex street, Salem, Mass.

Lynn, Winfield S., Indianapolis, Ind.

Lyon, C. Wesley, Spring Valley, O.

Lyons, Isaac L., Nos. 42 and 44 Camp street, New Orleans, La.

McCalunn, Neil A., Strong, Kan.

McClure, Archibald, Nos. 74 and 76 State street, Albany, N. Y.

McClure, William H., Nos. 74 and 76 State street, Albany, N. Y.

McCollough, Winfield S., No. 1346 Jacob street, Wheeling, W. Va.

McConville, Thomas A., Pio Nono College, Macon, Ga.

McElhenie, Thomas D., No. 259 Ryerson street, Brooklyn, N. Y.

McIlhenny, John K., Wilmington, N. C.

McIntyre, Byron F., No. 99 North Moore street, New York.

McIntyre, Ewen, No. 874 Broadway, N. Y.

McIntyre, William, No. 2229 Frankford avenue, Philadelphia, Pa.

McKelway, George J., No. 1410 Chestnut street, Philadelphia, Pa.

McKenney, Jesse F., Shelbyville, Ky.

McKesson, John, Jr., No. 91 Fulton street, New York.

McKimmie, George D., Detroit, Mich.

McLeod, Roderick, Quebec, Can.

McLelland, Robert C., Main street, Bryan, Texas.

McNeil, John M., Broadway, Scottdale, Westmoreland County, Pa.

McPherson, George, Chicago, Ill.

Macdonald, George, No. 106 Main street, Kalamazoo, Mich.

Mace, F. Bordon, Front street, Beaufort, N. C.

Mack, Adolph, No. 11 Front street, San Francisco, Cal.

Macmahon, Thomas J., No. 142 Sixth avenue, New York.

Main, Thomas F., No. 278 Greenwich street, New York.

MAISCH, JOHN M., No. 143 North Tenth street, Philadelphia, Pa.

Major, John R., No. 800 Seventh street, Washington, D. C.

Major, Oscar, Clinton, Iowa.

Mallinckrodt, Edward, cor. Mallinckrodt and Main streets, St. Louis, Mo.

Mangold, Gustavus A., No. 4 East State street, Trenton, N. J.

Markoe, George F. H., corner Warren and Dudley streets, Boston, Mass.

Marquardt, Jacob F., Washington street, Tiffin, O.

Marsh, Edward H., No. 10 Gold street, New York.

Marshall, Ernest C., No. 51 Vine street, Charlestown, Mass.

Marshall, Hubert J., S. W. cor. Second and Main streets, Aurora, Ind.

Martin, Charles C., Lewisport, Kentucky.

Martin, Emil, Russell avenue and South Meridian streets, Indianapolis, Ind.

Martin, Hugo W. C., Chicago, Ill.

Martin, William J., Cincinnati, O.

Marvin, Thomas E. O., Nos. 36 and 38 Bow street, Portsmouth, N. H.

Masi, Frederick H., Main and Granby streets, Norfolk, Va.

Mason, Norman N., No. 129 North Main street, Providence, R. I.

Mattern, William K., No. 2540 Germantown avenue, Philadelphia, Pa.

Mattison, Richard V., No. 332 North Front street, Philadelphia, Pa.

May, Arthur F., Cleveland, O.

May, James O., Post-office Block, Water street, Naugatuck, Conn.

Mayell, Alfred, cor. Euclid avenue and Erie street, Cleveland, O.

Maynard, Henry S., No. 626 West Lake street, Chicago, Ill.

Mehringer, Joseph A., Jasper, Dubois Co., Ind.

Meininger, Albert, cor. Vine and Twelfth streets, Cincinnati, O.

Melchers, Henry, cor. Genesee and Jefferson streets, East Saginaw, Mich.

Mellor, Alfred, No. 218 North Twenty-second street, Philadelphia, Pa.

Melvin, J. Lacy, Main and Pearl streets, Westville, Conn.

Melvin, James S., No. 43 Temple Place, Boston, Mass.

Menninger, Henry J., No. 79 Sands street, Brooklyn, N. Y.

Merrell, George, No. 5 West Fifth street, Cincinnati, O.

Merrell, William S., No. 5 West Fifth street, Cincinnati, O.

MERRILL, CHARLES A., No. 52 Water street, Exeter, N. H.

Metcalf, Theodore, No. 29 Tremont street, Boston, Mass.

Metzner, Adolph, No. 94 East Washington street, Indianapolis, Ind.

Meyer, Christian F. G., No. 8 North Second street, St. Louis, Mo.

Meyers, Edward T., No. 16 Main street, Bethlehem, Pa.

Meyers, James A., Odd Fellows' Hall, Columbia, Pa.

Michaelis, Charles O., cor King and Cannon streets, Charleston, S. C.

Michaelis, Gustavus, No. 1 Myrtle avenue, Albany, N. Y.

Milburn, John A., No. 1101 F street, N. W., Washington, D. C.

Milhau, Edward L., No. 183 Broadway, New York.

Milleman, Philip, cor. Milwaukee avenue and Division street, Chicago, Ill.

Miller, Adolphus W., cor. Third and Callowhill streets, Philadelphia, Pa.

Miller, C. E., cor. Illinois and Market streets, Indianapolis, Ind.

Miller, Frederick C., cor. Clay and Market streets, Louisville, Ky.

Miller, George Y., No. 2 River street, Luzerne, Warren Co., N. Y.

Miller, Jacob A., cor. Second and Chestnut streets, Harrisburg, Pa.

Miller, Jason A., Gloversville, Fulton Co., N. Y.

Miller, Louis, No. 49 High street, Mount Holly, N. J.

Miller, Robert McClefferty, Malone, N. Y.

Milligan, Decatur, No. 509 North Second street, Philadelphia, Pa.

Milliner, William T., Union street, Spencerport, N. Y.

Miner, Maurice A., Wisconsin street, Geneva, Wis.

Mingay, James, No. 472 Broadway, Saratoga Springs, N. Y.

Miville, Francis C., No. 1023 Elm street, Manchester, N. H.

Moenkemoeller, Charles, cor. Twenty-second and Market streets, Wheeling, W. Va.

Moffit, Thomas S., No. 322 Clay street, San Francisco, Cal.

Mohr, Charles, No. 177 Dauphin street, Mobile, Ala.

Moise, Benjamin F., No. 130 Meeting street, Charleston, S. C.

Moith, Augustus T., No. 1 Ferry street, Fishkill, N. Y.

Moll, William, cor. Court and Hamilton streets, Saginaw City, Mich.

Molwitz, Ernest, No. 966 Sixth avenue, New York.

Monsarrat, Oscar, No. 113 South Broadway, Baltimore, Md.

Montgomery, Melvin, Silver Creek, Chautauqua Co., N. Y.

Moody, Richard H., cor. Main and High streets, Belfast, Me.

Mook, Philip G., No. 7 North Side Square, Greenfield, Ill.

Moore, George, No. 26 Market street, Somersworth, N. H.

Moore, J. Faris, Howard and Madison streets, Baltimore, Md.

Moore, James P., No. 62 Lake street, Chicago, Ill.

Moore, James S., West Stockbridge, Mass.

Moore, Joachim B., Thirteenth and Lombard streets, Philadelphia, Pa.

Moore, Silas H., No. 80 Fourth street, Sioux City, Iowa.

Moore, Thomas F., Mobile, Ala.

Moore, Arthur J., Sioux City, Iowa.

Moorhead, William W., No. 818 Arch street, Philadelphia, Pa.

Morgan, Benjamin G., Main and Jackson streets, Hyde Park, Pa.

Morgan, James, Ypsilanti, Mich.

Morgan, Richard E., No. 135 High street, Holyoke, Mass.

Morley, William J., No. 207 East Pecan street, Austin, Texas.

Morrill, Benjamin, Blue Hill, Me.

Morris, Lemuel I., No. 3 Broglie Platz, Strassburg, Germany.

Morris, Thomas H., Shreveport, La.

Morrison, J. Ellwood, No. 25 Sharp street, Baltimore, Md.

Morrison, Thomas O., No. 262 Eighth avenue, New York.

Morse, Edward Webster, Oswego, New York.

Mortimer, William G., Chicago, Ill.

Mott, George F., Catskill, Greene Co., N. Y.

Mott, Henry A., Jr., No. 117 Wall street, New York.

Mueller, Adolphus, Cherry street, Highland, Ill.

Mueller, Louis H., No. 249 East Washington street, Indianapolis, Ind.

Munds, James C., Third street, Wilmington, N. C.

Munger, John F., No. 361 Broadway, Greenbush, N. Y.

Munson, Luzerne J., Apothecaries' Hall, Waterbury, Conn.

Murray, Bernard J., No. 3356 Ridge avenue, Philadelphia, Pa.

Murray, Francis M., Lenni, Delaware Co., Pa.

Muth, John P., Nos. 14 and 16 German street, Baltimore, Md.

Myers, Daniel, Cleveland, O.

Nagle, Asher C., Bridge street, Wheeling, W. Va.

Napier, Henry B., Owego, N. Y.

Neergaard, Sidney H., No. 1183 Broadway, New York city.

Newbold, Thomas M., No. 4160 Chestnut street, Philadelphia, Pa.

Newman, Alcuin E., Hot Springs, Arkansas.

Newman, George A., cor. Fifth and Walnut streets, Louisville, Ky.

Newman, George A., No. 380 Myrtle avenue, Brooklyn, N. Y.

Newton, John, No. 36 Beekman street, New York city.

Nichols, Edward P., No. 901 Broad street, Newark, N. J.

Nichols, Thomas B., No. 159½ Essex street, Salem, Mass.

Nicot, Louis F., No. 65 Union avenue, Brooklyn, N. Y.

Niebrugge, John A., No. 506 Bedford avenue, Brooklyn, N. Y.

Nienstaedt, Hermann, Minnesota Soap Co., Minneapolis, Minn.

Nietsch, Adolph J. W., Harrison avenue and Walton street, Brooklyn, N. Y.

Nipgen, John A., Chillicothe, O.

Noble, John J., Centre and Pelham streets, Newton Centre, Mass.

Nodler, Peter, N. E. cor. Fifth and Madison streets, Covington, Ky.

Noyes, Daniel R., St. Paul, Minn.

Oatman, Le Roy S., No. 5 Commercial street, Angola, Erie Co., N. Y.

Oberdeener, M., Santa Clara, Cal.

O'Brien, James J., No. 53 Kneeland street, Boston, Mass.

O'Brien, John W., No. 1727 Cass avenue, St. Louis, Mo.

O'Donnel, James D., No. 751 Eighth street, Washington, D. C.

O'Neil, Henry M., No. 463 Hudson street, New York city.

Ohliger, Lewis P., No. 23 West Liberty street, Wooster, O.

Oldberg, Oscar, St. Louis, Mo.

Oleson, Olaf M., Market street, Fort Dodge, Iowa.

Oliver, William M., No. 132 Broad street, Elizabeth, N. J.

Ollif, James H., No. 855 Fulton street, Brooklyn, N. Y.

Orne, Charles P., No 493 Main street, Cambridgeport, Mass.

Orne, Joel S., No. 493 Main street, Cambridgeport, Mass.

Osann, Bernhard, No. 107 Fourth avenue, New York city.

Osgood, Hugh H., No. 148 Main street, Norwich, Conn.

Osmun, Charles A., No. 13 Seventh avenue, New York.

Ottinger, James J., Twentieth and Spruce streets, Philadelphia, Pa.

Otto, Charles H., No. 157 Prince street, New York city.

Owens, James A., No. 45 Dominick street, Rome, N. Y.

Owens, Richard J., cor. Myrtle and Spencer streets, Brooklyn, N. Y.

Oxley, Jefferson, Nicholasville, Ky.

Packard, Durand C., No. 91 Fulton street New York, and Watertown, New York.

Page, George S., No. 10 Warren street, New York.

Paine, James D., No. 18 Buffalo street, Rochester, N. Y.

Paine, Milton K., cor. Main and State streets, Windsor, Vt.

Painter, Emlen, cor. Clay and Kearney streets, San Francisco, Cal.

Palmer, John D., cor. Public Square and Cherry streets, Monticello, Fla.

Panknin, Charles F., No. 123 Meeting street, Charleston, S. C.

Parcher, George A., Main street, Ellsworth, Me.

Parker, George H., Draper's Block, Main street, Andover, Mass.

Parker, John H., Sixth avenue near One Hundred and Twenty-fourth street, New York city.

Parr, John C., Main street, Weston, Mo.

Parrish, Clemmons, No. 12 Coenties Slip, New York.

Parrish, Dillwyn, No. 1017 Cherry street, Philadelphia, Pa.

Parsons, Henry B., No. 170 William street, New York, N. Y.

Parsons, John, No. 684 Wabash avenue, Chicago, Ill.

Parsons, Mathias W., Towanda, Pa.

Parsons, Richard, No. 182 Ontario street, Cleveland, O.

Parsons, Robert E., No. 19 Main street, Orange, N. J.

Partridge, Charles K., Granite Block, Augusta, Me.

Patch, Edgar L., No. 90 Green street, Boston, Mass.

Patten, I. Bartlett, No. 39 Harrison street, Boston, Mass.

Patton, John Franklin, York, Pa.

Patton, William A., Division street, Catlettsburg, Ky.

Patterson, James L., cor. Twenty-first street and Ridge avenue, Philadelphia, Pa.

Pauley, Frank C., cor. Eastern street and Compton avenue, St. Louis, Missouri.

Peabody, William H., No. 8 South Division street, Buffalo, N. Y.

Pearce, James H., No. 19 Front street, W. Toronto, Canada.

Pease, Francis M., Lee, Mass.

Peixotto, Moses L. M., No. 543 Fifth avenue, New York.

Penfold, Henry J., No. 5 Commercial street, Angola, Erie Co., N. Y.

Pennington, T. H. Sands, No. 400 Broadway, Saratoga, N. Y.

Penrose, Stephen F., S. E. cor. Main and Broad streets, Quakertown, Pa.

Perkins, Benjamin A., Nos. 74 and 76 Commercial street, Portland, Me.

Perkins, Elisha H., cor. Greene and Baltimore streets, Baltimore, Md.

Perkins, William A., No. 213 Main street, Virginia City, Nev.

Perot, T. Morris, No. 1810 Pine street, Philadelphia, Pa.

Perry, Bayard T., No. 1088 Elm street, Manchester, N. H.

Pettingill, Edward T., G and Twenty-first streets, N. W., Washington, D. C.

Pettit, Henry M., Carrollton, Mo.

Pettit, Louis C., New Lisbon, O.

Pfingst, Edward C., cor. Third and Breckenridge streets, Louisville, Ky.

Pfingst, Ferdinand J., cor. Twentieth and Market streets, Louisville, Ky.

Pfingst, Henry A., cor. Eleventh and Market streets, Louisville, Ky.

Pfingsten, Gustavus, No. 6 Whitehall street, New York.

Phelps, Dwight, opposite Methodist Church, West Winstead, Conn.

Phillips, Charles W., No. 484 Eastern avenue, Cincinnati, O.

Phillips, Walter F., Nos. 134, 136, and 138 Middle street, Portland, Me.

Phipps, John M., Day's Block, Main street, Monson, Mass.

Physick, Henry S., No. 810 Olive street, St. Louis, Mo.

Pierce, Frank W., Main street, Chester Vt.

Pierce, William H., No. 2147 Washington street, Boston, Mass.

Pile Gustavus, No. 770 Passyunk avenue, Philadelphia, Pa.

Pilsbury, Frank O., Walpole, Mass.

Pinkham, Alonzo T., Franklin Square Dover N. H.

Pitt, John R., Jr., No. 218 Main street, Middletown, Conn.

Plaisted, James H., Main street, Waterville, Me.

Plantz, C. Herman, No. 709 Milwaukee avenue, Chicago.

Plummer, David G., No. 6 Main street, Bradford, Stark Co., Ill.

Plummer, E. M., Sterling, Rice Co., Kan.

Plummer, H. S., Sterling, Rice Co., Kan.

Plummer, William L., St. Louis, Mo.

Plummer, William P., Bradford, Stark Co., Ill.

Poley, Francis H., No. 1729 South Second street, Philadelphia, Pa.

Pollard, Frank W., Hot Springs, Arkansas.

Porter, Chiton S., Eminence, Ky.

Porter, Henry C., cor. Main and Pine streets, Towanda, Pa.

Porter, W. C., Greensboro, N. C.

Post, Elisha, cor. Main and Pine streets, Athens, N. Y.

Post, William H., No. 21 Ferry street, Newark, N. J.

Potterfield, Clarence A., Charleston, Kanawha Co., W. Va.

Powell, Robert B., Eureka, Humboldt Bay, California.

Powell, Thomas W., No. 10 Houston street, Fort Worth, Texas.

Powell, William R., No. 91 Fulton street, New York city.

Power, Frederick B., No. 145 North Tenth street, Philadelphia, Pa.

Powers, Charles J., No. 11 South Salina street, Syracuse, N. Y.

Prall, Delbert E., Ottumwa, Ia.

Prentice, Frederick F., opposite Post-office, Janesville, Wis.

Prescott, Albert B., University of Michigan, Ann Arbor, Mich.

Prescott, Horace A., No. 507 Washington street, Boston, Mass.

Preston, Andrew P., State street, Portsmouth, N. H.

Preston, David, cor. Ninth and Lombard streets, Philadelphia, Pa.

Preuss, Edward A., No. 21 Spring street, Los Angeles, Cal.

Price, Charles H., Salem, Mass.

Priddy, Robert S., No. 19 Sandwich street, Windsor, Ontario, Canada.

Prieson, Adolph, Main and Desper streets, Lock Haven, Pa.

Procter, Wallace, cor. Ninth and Lombard streets, Philadelphia, Pa.

Proctor, Benjamin, No. 6 Healey's Arcade, Lynn, Mass.

Punch, William F., No. 71 Dauphin street, Mobile, Ala.

Purcell, John B., No. 1216 East Main street, Richmond, Va.

Pursell, Howard, S. W. cor. Mill and Cedar streets, Bristol, Pa.

Pyle, Cyrus, No. 326 Fulton street, Brooklyn, N. Y.

Raas, Francis, Union and Hoyt streets, Brooklyn, N. Y.

Rackley, Benjamin F., Franklin Square and Charles street, Dover, N. H.

Rademaker, Hermann H., cor. Madison and Shelby streets, Louisville, Kentucky.

Ramsperger, Gustavus, No. 703 Fulton street, Brooklyn, N. Y.

Randall, George D., Railroad street, St. Johnsbury, Vt.

Rankin, Charles F., No. 123 Meeting street, Charleston, S. C.

Rankin, Jesse W., Decatur and Pryor streets, Atlanta, Ga.

Rano, Charles O., No. 1872 Niagara street, Buffalo, N. Y.

Rapelye, Charles A., No. 605 Main street, Hartford, Conn.

Raser, John B., No. 164 North Eighth street, Reading, Pa.

Redsecker, J. H., Lebanon, Pa. `

Reed, Frederick, Natick, Mass.

Reed, I N., No 139 Summit street, Toledo, O.

Reed, John H., Washington cor. Christopher street, New York.

Reichardt, F. Alfred, No. 45 Maiden lane, New York.

Reichenbach, Fred. F., N. W. cor. Fifth and Market streets, St. Louis, Mo.

Reinhold, William, No. 146 North Clark street, Chicago, Ill.

Reinlein, Paul, Washington, D. C.

Reiss, Edward C., Tenth and Madison streets, Covington, Ky.

Remington, Joseph P., cor. Thirteenth and Walnut streets, Philadelphia, Pa.

Rendings, Charles P., cor. Spring and Abigail streets, Cincinnati, O.

Renouff, James T., Main street, Winstead, Conn.

Restieaux, Thomas, No. 29 Tremont street, Boston, Mass.

Reule, John, Lafayette, Ind.

Reum, Hermann F., corner Fifth and Broadway, Cincinnati, O.

Reusch, Ernst, No. 164 Nevins street, Brooklyn, N. Y.

Reynolds, Charles E., U. S. Receiving Ship Colorado, Brooklyn, N. Y.

Reynolds, Howard P., cor. Front and Cherry streets, Plainfield, N. J.

Reynolds, John J., Flemingsburg, Ky.

Reynolds, William K., No. 254 Friendship street, Providence, R. I.

Rhoades, Stephen H., No. 88 Main street, Pittston, Pa.

Rice, Charles, Bellevue Hospital, N. Y.

Rich, Willis S., No. 57 Smith street, Brooklyn, N. Y.

Richardson, James, No. 2827 Locust street, St. Louis, Mo.

Richardson, James H., No. 52 Lake street, Chicago, Ill.

Richardson, J. Clifford, No. 704 North Main street, St. Louis, Mo.

Ricker, George D., No 178 Salem street, Boston, Mass.

Ricksecker, Theodore, No. 146 William street, New York.

Rickey, Randal, No. 157 North Green street, Trenton, N. J.

Riddell, James A., Aurora, Ind.

Ridgway, Lemuel A., Mansfield, Tioga County, Pa.

Rieffenstahl, Julius, Buffalo, N. Y.

Riley, Charles W., No. 1115 Race street, Philadelphia, Pa.

Risk, Clarence H., Charles and Read streets, Baltimore, Md.

Rittenhouse, Henry N., No. 218 North Twenty-second st., Philadelphia, Pa.

Robbins, Alonzo, cor. Eleventh and Vine streets, Philadelphia, Pa.

Robbins, Charles A., No. 91 Fulton street, New York.

Robbins, Daniel C., No. 91 Fulton street, New York.

Roberts, D. J., Peabody, Kan.

Roberts, Joseph, corner Harford and Greenmount avenues, Baltimore, Md.

Robertson, Archibald C., Allegheny City, Pa.

Robinson, Frederick, Kenosha, Wis.

Robinson, James S., cor. Second and Madison streets, Memphis, Tenn.

Robinson, William S., Yorkville, Toronto, Can.

Roche, Edward M., No. 611 South Fifteenth street, Philadelphia, Pa.

Rockefeller, Lucius, Palisade avenue, Englewood, N. J.

Rogers, Arthur H., Geneseo, N. Y.

Rogers, Wiley, corner Fifteenth and Chestnut streets, Louisville, Ky.

Rogers, William H., North street, Middletown, N. Y.

Rollins, John F., Fort George, Fla.

Rolph, Charles W., Castile, Wyoming County, N. Y.

Rommel, Emanuel, Lewiston and Ontario streets, Suspension Bridge, N. Y.

Ronnefeld, Theodore, No. 195 Gratiot street, Detroit, Mich.

Rose, Henry J., cor. Yonge and Queen streets, Toronto, Ont.

Rosengarten, Mitchell G., corner Seventeenth and Fitzwater streets, Philadelphia, Pa.

Rosenwasser, Nathan, No. 112 Superior street, Cleveland, O.

Ross, Ellison H. Adrian, Mich.

Roth, Eugene N., Market street, between Green and St. Louis streets, Thibodeaux, La.

Royce, Lucien M., No. 91 Fulton street, New York.

Ruete, Theodore W., No. 379 Main street, Dubuque, Iowa.

Rumsey, Samuel L., corner Main street and Arlington avenue, East Orange, N. J.

Runyon, Edward W., care of Redington & Co., San Francisco, Cal.

Ruppert, John, Cincinnati, O.

Russell, E. Walter, cor. Baltimore and Eutaw streets, Baltimore, Md.

Russell, Elias S., No. 69 Main street, Nashua, N. H.

Russell, Eugene J., corner Army street and Canton avenue, Baltimore, Maryland.

Rust, William, No. 7 Peace street, New Brunswick, N. J.

Ryerson, Henry O., Newton, N. J.

Safford, William B., corner Vance and Hernando streets, Memphis, Tenn.

Sander, Enno, corner Nineteenth and South Eleventh streets, St. Louis, Mo.

Sanderson, George H., No. 295 Main street, Waltham, Mass.

Sanderson, Stephen Francis, Rochester, N. Y.

Sands, George G., No. 4 Vanderbilt avenue, New York.

Sappington, Richard, No. 131 North Gay street, Baltimore, Md.

Sargent, Ezekiel H., No. 125 State street, Chicago, Ill.

Sauer, Louis W., Central avenue and Baymiller street, Cincinnati, O.

Saunders, Richard B., Chapel Hill, N. C.

Saunders, William, London, Ontario, Can.

Sautter, Louis, corner South Pearl and Plain streets, Albany, N. Y.

Savage, Thomas J., Mobile, Ala.

Sayre, Edward A., No. 461 Myrtle avenue, Brooklyn, N. Y.

Sayre, William H., corner Warner and Orange streets, Newark, N. J.

Scala, William Franklin, No. 50 East Capitol street, Washington, D. C.

Scattergood, George J., No. 626 Spruce street, Philadelphia, Pa.

Schaaf, Justus H., cor Second and Pine streets, Gallipolis, O.

Schafer, George H., No. 120 Front street, Fort Madison, Iowa.

Schaffle, Samuel W. W., Market street, Lewisburg, Pa.

Schafhirt, Adolph J., cor. First and H streets, Washington, D. C.

Schambs, George M., No. 104 Huntington street, Cleveland, O.

Scheffer, Emil, No. 145 Market street, Louisville, Ky.

Scheffer, Henry W., No. 218 Clark avenue, St. Louis, Mo.

Schellentrager, E. A., No. 717 St. Clair street, Cleveland, O.

Scherff, John P., Glenwood avenue and Washington street, Bloomfield, N. J.

Schermerhorn, Winfield S., Main street, Stillwater, Saratoga County, N. Y.

Schiemann, Edward B., corner M and Walnut streets, Louisville, Ky.

Schlaepfer, Henry J., cor. Main and Second streets, Evansville, Ind.

Schley, Steiner, No. 16 West Patrick street, Frederick City, Md.

Schmidt, Florian C., Fulton avenue and Franklin street, Evansville, Ind.

Schmitt, Joseph M., No. 108 North avenue, Rochester, N. Y.

Schœttlin, Albert J., No. 301 West Broadway, Louisville, Ky.

Scholtz, Edmund L., Denver, Col.

Schrader, Henry, No. 74 East Washington street, Indianapolis, Ind.

Schranck, Henry C., Nos. 437 and 439 East Water street, Milwaukee, Wis.

Schreck, Leo S., No. 114 John street, Cincinnati, O.

Schreiber, August, Odd Fellows' Hall, Eighth street, Tell City, Ind.

Schroder, Hermann, No. 525 Main street, Quincy, Ill.

Schueller, Ernst, No. 231 South High street, Columbus, O.

Schueller, Frederick W., Nos. 190 and 192 South High street, Columbus, O.

Schuerman, F., Cincinnati, O.

Schumann, P. J., Whitehall and Hunter streets, Atlanta, Ga.

Schumann, Theodore, cor. Whitehall and Hunter streets, Atlanta, Ga.

Schwartz, John C., Hamilton, O.

Scofield, James S., Ninth avenue and Fifty-seventh street, New York.

Scott, Nelson R., cor. Main and Southridge streets, Worcester, Mass.

Scott, William H., No. 1617 Seventeenth street, Richmond, Va.

Scott, William J., No. 257 Prospect street, Cleveland, O.

Scoville, Charles H., Tonawanda, Erie Co., N. Y.

Seabury, George J., No. 21 Platt street, New York city.

Searby, William M., No. 859 Market street, San Francisco, Cal.

Searle, Gideon D., Anderson, Ind.

Sechler, James C., No. 201 Mill street, Danville, Pa.

Sedberry, Bond E., Fayetteville, N. C.

Seitz, Oscar, Salina, Kan.

Senier, Frederick S., No. 1164 Humboldt avenue, Milwaukee, Wis.

Sennewald, Ferdinand W., No. 800 Hickory street, St. Louis, Mo.

Serodino, Herman, Cincinnati, O.

Sevin, N. Douglass, No. 141 Main street, Norwich, Conn.

Sewald, David J., Dorchester avenue and Adam street, Boston, Mass.

Seward, Richard, St. James Hotel, Denver, Col.

Sharp, Alpheus P., cor. Pratt and Howard streets, Baltimore, Md.

Sharples, Stephen P., No. 114 State street, Boston, Mass.

Shaw, Lewis, Cheyenne, W. T.

Shaw, Robert J., No. 3 East Front street, Plainfield, N. J.

Shead, Edward E., No. 8 Water street, Eastport, Me.

Shearer, Edward Y., No. 1103 Second avenue, New York city.

Shedd, Edwin W., No. 61 Warren street, Boston, Mass.

Sheddon, John W., No. 1275 Broadway, New York city.

Sheils, George E., No. 896 Broadway, New York city.

SHEPPARD, SAMUEL A. D., No. 1129 Washington street, Boston, Mass.

Sherwood, Hezekiah S., No. 459 Main street, Poughkeepsie, N. Y.

Sherwood, Louis W., No. 31 West Broad street, Columbus, O.

Shinn, James T., cor. Broad and Spruce streets, Philadelphia, Pa.

Shivers, Charles, cor. Seventh and Spruce streets, Philadelphia, Pa.

Shoemaker, Richard M., cor. Fourth and Race streets, Philadelphia, Pa.

Shrader, John L., Market street, Wappinger's Falls, N. Y.

Shreve, John A., Port Gibson, Miss.

Shriver, Henry, No. 53 Baltimore street, Cumberland, Md.

Shryer, Thomas W., No. 103 Baltimore street, Cumberland, Md.

Shryock, Allen, No. 1129 Mount Vernon street, Philadelphia, Pa.

Shurtleff, Israel A., No. 39 Elm street, New Bedford, Mass.

Siegemund, Charles A., No. 1553 Washington street, Boston, Mass.

Siegenthaler, Harvey N., No. 55 East Main street, Springfield, O.

Simmons, Karl, St. Paul, Minn.

Simms, Giles G. C., No. 1344 New York avenue, Washington, D. C.

Simpson, William, No. 33 Fayetteville street, Raleigh, N. C.

Simpson, William, No. 609 Davis street, San Francisco, Cal.

Simson, Francis C., care of Brown & Webb, Halifax, N. S.

Simpers, J. Wilmer, cor. Thirteenth street and Columbia avenue, Philadelphia, Pa.

Sitton, Charles E., No. 151 First street, Portland, Oregon.

Skelly, James T., No. 339 East Fourteenth street, New York city.

Slater, Frank H., Main street, Matawan, Monmouth Co., N. J.

Sloan, George W., Nos. 7 and 9 East Washington street, Indianapolis, Indiana.

Slocum, Frank L., No. 3 Broglie Platz, Strassburg, Germany.

Slosson, Frank W., No. 223 Superior street, Cleveland, O.

Slosson, George, Coffeyville, Kan.

Smalley, Elijah, No. 271 Harrison avenue, Boston, Mass.

Smenner, J. Edwin, New Wilmington, Pa

Smith, Arthur G., Belvidere, N. J.

Smith, Auborn, London, O.

Smith, Charles B., No. 861 Broad street, Newark, N. J.

Smith, Israel P., No. 324 Bank street, Newark, N. J.

Smith, Joseph S., No. 193 S. Howard street, Akron, O.

Smith, Linton, cor. Seventh and Market street, Wilmington, Del.

Smith, Samuel H., Liberty street, Winston, N. C.

Smith, Willard, Rochester, N. Y.

Smith, Willard A., Main street, Richfield Springs, N. Y.

Smithnight, Albert, No. 135 Woodland avenue, Cleveland, O.

Smyser, William C., Virginia avenue, Windsor, Shelby Co., Ill.

Sniteman, Charles C., Neillsville, Wis.

Snow, Charles W., No. 28 East Genesee street, Syracuse, N. Y.

Snow, Jesse W., No. 23 Charles street, Boston, Mass.

Snyder, Alva L., No. 33 Court Square, Bryan, O.

Snyder, Ambrose C., cor. Court and Atlantic avenue, Brooklyn, N. Y.

Sombart, John E., Boonville, Mo.

Somers, Frank G., No. 125 State street, Chicago, Ill.

Somers, George H., Canton, O.

Somers, Richard M., Seventeenth and Oxford streets, Philadelphia, Pa.

Spalding, Warren A., No. 19 Church street, New Haven, Conn.

Spannagel, Charles C., No. 1607 Ridge avenue, Philadelphia, Pa.

Spenzer, Peter I., No. 88 Garden street, Cleveland, Oo

Sperry Herman J., No. 151 Chapel street, New Haven, Conn.

Spieth, William F., No. 273 Woodland avenue, Cleveland, O.

Springer, William T., Louisville, Ky.

Squibb, Edward H. No. 36 Doughty street, Brooklyn, N. Y.

Squibb, Edward R., No. 36 Doughty street, Brooklyn, N. Y.

Stacy, Benjamin F., No. 51 Vine street, Charlestown, Mass.

Stahler, William, S. E. cor. Main and Swede streets, Norristown, Pa.

Staley, Michael S., Indianapolis, Ind.

Stam, Colin F., Chestertown, Md

Stamford, William H., No. 256 Mulberry street, Newark, N. J.

Standford, W. A., Florence Kan

Stanford, James W., Cuthbert, Ga.

Stanley, E. C., No. 6 Beach avenue, Auburn, N. Y.

Stanley, Frederick P., Atlanta, Ga.

Starr, Thomas, No. 313 Ninth avenue, New York city.

Steele, Henry, N. E. cor. Turk and Taylor streets, San Francisco, Cal.

Steele, James G., No. 316 Kearney street, San Francisco, Cal.

Stein, Jacob H., No. 803 Penn street, Reading, Pa.

Steinhauer, Frederick, Denver, Col.

Stevens, Luther F., Atlantic avenue cor. Court street, Brooklyn, N. Y.

Stierle, Adolph, No. 302 East Seventh street, St. Paul, Minn.

Still, Allen H., No. 60 Cedar street, N. Y.

Stoddart, Thomas, No. 84 E. Seneca street, Buffalo, N. Y.

Stowell, Daniel, No. 1045 Washington street, Boston, Mass.

Strachan, William E., No. 619 Third avenue, Brooklyn, N. Y.

Strassel, William, cor. Shelby and Broadway, Louisville, Ky.

Stuart, E. B., No. 233 Fifth street, Chicago, Ill.

Sturtevant, T. Frank, Wyandotte, Kan.

Sutton, Peter P., cor. Floyd and Market streets, Louisville, Ky.

Sweet, Caldwell, Bangor, Me.

Sweet, Frederick K., No. 2 Main street, Lockport, N. Y.

Sweet, Henry, cor. Kinsie and Desplaines streets, Chicago, Ill.

Sweet, William S., Pike, N. Y.

Tartis, Alfred J., No. 62 Broadway, E. D., Brooklyn, N. Y.

Taylor, Alfred B., No. 31 South Eleventh street, Philadelphia, Pa.

Taylor, Henry B., No. 1306 Girard avenue, Philadelphia, Pa.

Taylor, James H., No. 104 Thames street, Newport, R. I.

Taylor, John P., No. 99 Third street, New Bedford, Mass.

Test, Alfred W., cor. Second and Federal streets, Camden, N. J.

Thatcher, Joseph H., No. 12 Market street, Portsmouth, N. H.

Thatcher, Hervey D., No. 12 Market Square, Potsdam, N. Y.

Thayer, Frederick A., No. 134 South Halsted street, Chicago, Ill.

Thibodeaux, Joseph G., Main street, Thibodeaux, La.

Thomas, James, Jr., opposite Maxwell House, Nashville, Tenn.

Thomas, Oscar E., No. 212 East Broad street, Richmond, Va.

Thompson, Ebenezer K., No. 8 Diamond street, Titusville, Pa.

Thompson, Edward W., No. 181 Main street, New Britain, Conn.

Thompson, Thomas C., Galveston, Texas.

Thompson, William B., No. 1700 Mount Vernon street, Philadelphia, Pa.

Thompson, William P., No. 5 West Baltimore street, Baltimore, Md.

Thompson, William S., No. 705 Fifteenth street, Washington, D. C.

Thompson, William S., No. 5 West Baltimore street, Md.

Thomsen, John J., Nos. 14 and 16 German street, Baltimore, Md.

Thorn, Henry P., Medford, N. J.

Thorp, Abner, N. W. cor. Court and Plum streets, Cincinnati, O.

Thurber, Almon R., No. 134 Main street, Ashtabula, O.

Tiarks, Hermann, First street, Monticello, Iowa.

Tibbs, William H., No. 235 Main street, Buffalo, N. Y.

Tidball, Walton C., New York.

Tiernan, Frank M., Mansion House, Roselle, N. J.

Tilden, Henry A., New Lebanon, N. Y.

Tilyard, Charles S., cor. Green and Franklin streets, Baltimore, Md.

Tindall, Graham McF., No. 61 Commercial street, Aberdeen, Miss.

Tobey, Charles W., Troy, O.

Tomfohrde, John W., cor. Benton and West Eighteenth streets, St. Louis, Mo.

Tompkins, Orlando, Boston Theatre, Boston, Mass.

Tooker, William W., Sag Harbor, New York.

Topley, James, No. 166 Georgia street, Vallejo, Solano Co., Cal.

Tower, Levi, Jr., No. 1681 Washington street, Boston, Mass.

Townley, William W., No. 765 Broad street, Newark, N. J.

Townsend, Abram R., Marshalltown, Iowa.

Trask, Charles M., No. 21 Pleasant street, Boston, Mass.

Trimble, Henry, cor. Fifth and Callowhill streets, Philadelphia, Pa.

Troth, Samuel F., No. 1019 Cherry street, Philadelphia, Pa.

Troupe, Theodore, Springfield, O.

Truax, Charles, Cedar Rapids, Linn Co., Ia.

Tscheppe, Adolph, No. 1010 Third avenue, New York city.

TUFTS, CHARLES A., No. 25 Washington street, Dover, N. H.

Turner, George H., No. 296 South Pearl street, Albany, N. Y.

Turner, Isaac W., No. 139 Wayne street, Jersey City, N. J.

Turner, T. Larkin, No. 390 Tremont street, Boston, Mass.

Turnley, Pryor L., No 3 Choice Hotel, Rome, Ga.

Tuska, David, Second avenue and Eighty-sixth street, New York city.

Twombly, John H., Masonic Block, Main street, Newmarket, N. H.

Tyson, Samuel E., No. 141 West street, Georgetown, D. C.

Ubert, Julius C., cor. Lee and Division streets, Brooklyn, N. Y.

Ude George, No. 3610 North Tenth street, St. Louis, Mo.

Uhlich, Ferdinand G., No. 1401 Salisbury street, St. Louis, Mo.

Underhill, George F., cor. Main and School streets, Concord, New Hampshire.

Underhill, Joseph G., No. 397 Classon avenue, Brooklyn, N. Y.

Underhill, William H., Haverhill, Mass.

Underwood, Charles G., cor. Lewis street and Maverick Square, Boston, Mass.

Urban, Jacob P., No. 356 Ontario street, Cleveland, O.

Van Alstyne, Franklin B., Kinderhook, N. Y.

Van Antwerp, Garet, No. 71 Dauphin street, Mobile, Ala.

Van Auken, Jerrie A., No. 125 Main street, Gloversville, N. Y.

Vandegrift, John A., No. 69 High street, Burlington, N. J.

Vander Emde, Reinhold, No. 323 Bowery, New York city.

Vandervoord, Ransford W., No. 482 Broad street, Newark, N. J.

Van Patten, William J., College street, Burlington, Vt.

Vansant, Robert H., Pitman avenue, Ocean Grove, N. J.

Van Winkle, Abraham W., No. 35 Clinton avenue, Newark, N. J.

Vars, Enoch W., Main street, Niantic, R. I.

Vaughan, P. W., Durham, Orange Co., N. C.

Vaupel, Charles P., Cleveland, O.

Venable, Richard H., Third street and Public Square, Bardstown, Ky.

Verner, James, No. 235 Woodward avenue, Detroit, Mich.

Viallon, Paul L., Park and Front streets, Bayou Goula, La.

Vickery, William H., S. W. cor. Central and Orchard streets, Dover, New Hampshire.

Vilter, Herman, McMicken avenue and Locust street, Cincinnati, O.

Vincent, William, No. 117 Broadway, Brooklyn, E. D., N. Y.

Voelcker, Rudolph, No. 217 Market street, Galveston, Texas.

Vogeler, Adolph G., No. 445 N. Clark street, Chicago, Ill.

Voorhees, William H., No. 21 Front street, Plainfield, N. J.

Vordick, August H., S. E. cor. Jefferson avenue and Benton street, St. Louis, Mo.

Vreeland, Cyrus E., Main street near Washington, Orange, N. J.

Vreeland, Phrank Z., No. 200 Stockton street, San Francisco, Cal.

Wagner, Henry, cor. Fourth and Elm streets, Cincinnati, O.

Wahmhoff, J. H., Delphos, O.

Wakefield, Seth D., No. 72 Lisbon street, Lewiston, Me.

Walbrach, Arthur, Denver, Col.

Walch, Robert H., No. 1412 Walnut street, Philadelphia, Pa.

Walker, Anselle, Freehold, N. J.

Walker, Charles, Hannibal, Mo.

Walker, Francis W., Jr., New Brighton, Pa.

Walker, George, Girard, Kan.

Walker, William J., No. 74 State street, Albany, N. Y.

Wallace, A. C., Main street, Bellefontaine, O.

Wallace, Austin E., No. 1 Goodrich Block, Nashua, N. H.

Walton, Harry C., Laurel and Cutter streets, Cincinnati, O.

Wangler, Conrad D., Eastside, Waterloo, Ia.

Wanier, George S., No. 407 Eighth avenue, New York city.

Wardell, Robert C., Battle Creek, Mich.

Warne, Henry L., Whitewater, Wis.

Warner, William R., No. 1228 Market street, Philadelphia, Pa.

Warren, Mrs. Ella F., Bellville, Richland Co., O.

Watjen, Herman J., Vincennes, Ind.

Waugh, George J., Stratford, Ontario, Canada.

Wayne, Edward S., No. 146 Broadway, Cincinnati, O.

Weaver, Charles A., cor. Fifth and Walnut streets, Des Moines, Ia.

Weaver, John A., No. 210 Madison avenue, Easton, Pa.

Webb, John A., No. 210 Madison avenue, Baltimore, Md.

Webb, McHenry, Powers House, Columbia, Mo.

Webb, William H., No. 556 North Sixteenth street, Philadelphia, Pa.

Webber, Joseph T., cor. Main and State streets, Springfield, Mass.

Weber, William, cor. Fifteenth and Thompson streets, Philadelphia, Pa.

Webster, Stephen, No. 63 Warren avenue, Boston, Mass.

Weichsel, Franz, No. 602 Pearl street, Cleveland, O.

Weidemann, Charles A., No. 563 North Twenty-second street, Philadelphia, Pa.

Weinman, Oscar C., No. 173 Seventh avenue, N. Y.

Weiser, Albert, cor. St. Paul and Main streets, St. Paul, Minn.

Weiser, Emilius I., Decorah, Ia.

Weismann, Augustus W., No. 257 Broome street, New York city.

Welch, Leonard E., corner Broad and Washington streets, Albany, Ga.

Wellcome, Henry S., No. 8 Snowhill, London, England.

Wells, Charles W., Maynard, Mass.

Wells, Ebenezer M., Houston street, Fort Worth, Texas.

Wells, Jacob D., corner Fourth street and Central avenue, Cincinnati, O.

Wells, Romanta, No. 297 State street, New Haven, Conn.

Wendell, Henry E., corner Third and George streets, Philadelphia, Pa.

Wendler, Robert F. W., No. 404 Atlantic avenue, Brooklyn, N. Y.

Wenzell, William T., No. 852 Market street, San Francisco, Cal.

Westmann, F. H., No. 2744 Cass avenue, St. Louis, Mo.

Weusthoff, Otto S., No. 212 East Third street, Dayton, O.

Whall, Joseph S., No. 82 Hancock street, Quincy, Mass.

Wharton, John C., No. 38 Union street, Nashville, Tenn.

Wharton, William H., No. 38 Union street, Nashville, Tenn.

Wheeler, C. Gilbert, No. 81 Clark street, Chicago, Ill.

Wheeler, Lucian F., Waldo, Fla.

WHITE, AARON S., No. 59 High street, Mount Holly, N. J.

White, George H., cor. Newark and Jersey avenues, Jersey City, New Jersey.

White, Philip A., No. 102 Gold street, New York.

Whitfield, Thomas, No. 240 Wabash avenue, Chicago, Ill.

Whiting, Frederick T, Main street, Great Barrington, Mass.

Whitman, Nelson S., No. 3 Merchants' Exchange, Nashua, N. H.

Whitney, Henry M., corner Essex and Lawrence streets, Lawrence, Massachusetts.

Wichelns, Frederick, Bowery and Fourth street, New York.

Wickham, William H., No. 91 Fulton street, New York.

Wiegand, Thomas S., No. 3742 Market street, Philadelphia, Pa.

Wienges, Conrad, cor. Coles and Fourth street, Jersey City, N. J.

Wigen, Carl R., No. 213 Jefferson street, Burlington, Iowa.

Wike, Albert D., No. 8 Market street, Marietta, Pa.

Wilcox, Frederick, Apothecaries' Hall, Exchange Place, Waterbury, Connecticut.

Wilder, Graham, No. 1[illegible]1 Main street, Louisville, Ky.

Wilder, Hans M., No. 84 Eighteenth street, Detroit, Mich.

Williams, Duane B., Worcester, New York.

Williams, John K., No. 391 Main street, Hartford, Conn.

Williams, Richard J. C., No. 2 Union Block, Cambridge, N. Y.

Williams, William H., No. 659 Main street, Wheeling, W. Va.

Williamson, E. J., Ninth and Franklin streets, St. Louis, Mo.

Wilson, Benjamin O., No. 28 Merchants' Row, Boston, Mass.

Wilson, Julius H., No. 189 Maxville street, Chicago, Ill.

Wilson, William, No. 106 Broadway, cor. Pine street, New York.

Wingate, Jeremiah Y., S. E. cor. Silver and Locust streets, Somersworth, New Hampshire.

Winkleman, John H., cor. Liberty and German streets, Baltimore, Md.

Winslow, Edwin C., No. 107 Main street, Danville, Ill.

Winslow, Samuel W., No. 33 Kingston street, Boston, Mass.

Winter, Jonas, No. 81 West Franklin street, Hagerstown, Md.

Witte, Edward, No. 4128 Broadway, St. Louis, Mo.

Wohlfarth, Justin, No. 2002 Third avenue, New York.

Wolfe, Nathaniel, No. 213 Market street, Wilkesbarre, Pa.

Wolff, Lawrence, No. 1201 Chestnut street, Philadelphia, Pa.

Woltersdorf, Louis, No. 171 Blue Island avenue, Chicago, Ill.

Wood, Alonzo F., No. 2 Church street, New Haven, Conn.

Wood, Edward S., No. 14 Chauncey street, Cambridge, Mass.

Wood, Mason B., East Providence, R. I.

Woodbridge, George W., No 2 Faneuil Hall Square, Boston, Mass.

Woodman, Warren H., Danvers, Massachusetts.

Woodruff, Roderick S., No. 91 Bank street, Waterbury, Conn.

Woodward, Samuel M., No. 91 North Charles street, Baltimore, Md.

Worthington, J. Willits, Main street, Moorestown, N. J.

Wrampelmeier, Theodore J., Ann Arbor, Mich.

Wright, Archibald W., cor. Front and Market streets, Philadelphia, Pa.

Wright, William R., No 33 Kingston street, Boston, Mass.

Wynn, William, No. 406 Fulton street, Brooklyn, N. Y.

Yatman, John L., Orange Valley, New Jersey

Yeakel, Nathan W., Nos. 107 and 109 Columbia street, Lafayette, Ind

Yonge, St. John R., Savannah, Ga.

Yorston, Matthew M., No. 429 Central avenue, Cincinnati, O.

Young, Alexander N., No 10[illegible] Sixteenth street, Wheeling, W. Va.

Young, Judson J., Kansas City, Mo.

Zahn, Emil A., No. 1801 State street, Chicago, Ill.

Zeilin, John H., No. 512 Cherry street, Philadelphia, Pa.
Zeller, William S., Bellefonte, Centre County, Pa.
Zellhœfer, George, No. 91 Fulton street, New York.
Ziegler, Philip M., No. 526 Penn street, Reading, Pa.
Zimmerman, Charles, Peoria, Ill.
Zoeller, E. V., Tarboro, N. C.
Zwick, George G., corner Eleventh and Meridian streets, Covington, Ky.

LIST OF DECEASED MEMBERS.

HONORARY MEMBERS.

		Elected	Died.
Bache, Franklin, M.D.,	Philadelphia, Pa.,	1857	1864
Bailey, Montgomery J., M.D.,	New York,	1856	1873
Boullay, Pierre François Guillaume,	Paris, France,	1868	1869
Casselmann, Arthur, Ph.D.,	St. Petersburg, Russia,	1868	1872
Chevalier, Alphonse, M.D.,	Paris, France,	1871	1879
Deane, Henry,	London, England,	1868	1874
Durand, Elias,	Philadelphia, Pa.,	1857	1873
Farrington, Thomas,	Boston, Mass.,	1856	1867
Hanbury, Daniel,	London, England,	1868	1875
Ludwig, Hermann, Ph.D.,	Jena, Germany,	1871	1873
Mohr, Frederick, Ph.D.,	Bonn, Germany,	1868	1879
Robinet, Stephane,	Paris, France,	1868	1869
Wiggers, H. August L., Ph.D.,	Göttingen, Germany,	1877	1880
Wood, George B., M.D.,	Philadelphia, Pa.,	1857	1878

ACTIVE MEMBERS.

		Elected	Died.
Aimar, George Washington,	Charleston, S. C.,	1874	1877
Anderson, James H.,	New York,	1859	1866
Andrews, George Wansay (President 1856–57),	Baltimore, Md.,	1856	1877
Aspinwall, James S.,	New York,	1855	1874
Atwood, Charles Henry,	Boston, Mass.,	1856	1877
Bache, Charles L.,	San Francisco, Cal.,	1852	1854
Backus, James William,	Marine City, Mich.,	1867	1870
Badger, Charles William,	Newark, N. J.,	1870	1877
Balmer, James,	Baltimore, Md.,	1856	1866
Barry, John William,	Baltimore, Md.,	1856	1861
Baylis, William E. P.,	Brooklyn, N. Y.,	1860	1872
Baynon, John,	Shreveport, La.,	1858	1862
Beam, Isaac Richard,	Baltimore, Md.,	1873	1879
Bell, Alexander C.,	Chicago, Ill.,	1879	1881
Bell, Gotthold Emanuel,	Louisville, Ky.,	1874	1879
Benzinger, John Sylvester,	Baltimore, Md.,	1860	1869
Bertolett, William John,	Shreve, O.,	1872	1877
Bidwell, Marshall Spring,	Elmira, N. Y.,	1871	1877

		Elected.	Died.
Bigelow, Francis O.,	Medford, Mass.,	1859	1863
Billings, Samuel J.,	New York,	1860	1865
Bingham, John Calvin,	St. Johnsbury, Vt.,	1853	1870
Blair, Henry C.,	Philadelphia, Pa.,	1855	1862
Blaw, Hippolyt Anton,	Rochester, N. Y.,	1856	1870
Bowman, Henry K.,	Philadelphia, Pa.,	1869	1873
Boyden, Ashel,	Boston, Mass.,	1853	1877
Bray, William Thomas,	Wingham, Ontario,	1881	1882
Bright, James Evesson,	Worcester, Mass.,	1868	1872
Bringhurst, Ferris,	Wilmington, Del.,	1862	1871
Brown, John T.,	Boston, Mass.,	1859	1860
Brown, William,	Boston, Mass.,	1858	1875
Canavan, Benjamin,	New York city,	1855	1857
Carney, Charles Tibbets,	Boston, Mass.,	1853	1862
Caspari, Charles,	Baltimore, Md.,	1856	1870
Catlin, Thereon,	St. Louis, Mo.,	1871	1880
Chapman, William B. (Pres. 1854–55),	Cincinnati, O.,	1852	1874
Cherot, Leonce,	Memphis, Tenn.,	1865	1879
Churchill, George Washington,	Chelsea, Mass.,	1865	1869
Cleney, William F.,	Cincinnati, O.,	1859	1865
Coddington, Isaac,	New York city,	1855	1874
Colby, Moses D.,	Boston, Mass.,	1859	1870
Coon, Walter S.,	New York city,	1858	1861
Coppuck, Peter Van Pelt,	Mount Holly, N. J.,	1857	1869
Crawley, Francis Xavier,	St. Louis, Mo.,	1869	1882
Cressman, Noah,	Waterloo, Canada West,	1863	1864
Cunningham, James E.,	Pittsburgh, Pa.,	1860	1863
Cushman, Alexander,	New York city,	1858	1861
Daggett, Alfred, Jr.,	New Haven, Conn.,	1865	1878
Dalrymple, Charles Hoagland,	Morristown, N. J.,	1860	1882
Davies, Robert Jones,	Brooklyn, N. Y.,	1858	1872
De Motte, Henry Augustus,	Jersey City, N. J.,	1871	1873
D'Evers, Henry Gaston,	Chicago, Ill.,	1865	1870
Dodge, John P.,	New York city,	1865	1873
Dover, Thomas,	Dayton, O.,	1879	1881
Drischler, Francis,	New York city,	1881	1882
Dunk, Alfred Allen,	East Saginaw, Mich.,	1867	1879
Easterbrook, Ray B.,	New York city,	1858	1868
Ellis, Charles (Pres. 1857–58),	Philadelphia, Pa.,	1852	1873
Emanuel, Louis M.,	Linwood, Pa.,	1857	1868
Erben, John Singer,	Philadelphia, Pa.,	1868	1881
Everson, John C.,	Philadelphia, Pa.,	1863	1872
Eyster, Christopher Edward,	Yankton, Dak.,	1871	1877
Faber, John,	New York city,	1857	1881
Fish, George Brewster,	Saratoga Springs, N. Y.,	1860	1866
Fish, Henry Ferdinand,	New York city,	1852	1868
Foley, James Thomas,	Houston, Texas,	1878	1879
Folger, William Swain,	Boston, Mass.,	1875	1878
Forester, Richard,	Brooklyn, N. Y.,	1860	1862
Fowle, Henry Dearborn,	Boston, Mass.,	1853	1882
Frohwein, Max,	New York city,	1865	1877

		Elected	Died.
Frost, John Johnson,	Lexington, Ky.,	1874	1880
Fulton, John Culpepper P.,	Brooklyn, N. Y.,	1873	1874
Gabaudan, Arthur W.,	New York city,	1862	1870
Gaither, Francis Singleton,	Washington, D. C.,	1860	1876
Gay, William,	Cambridgeport, Mass.,	1858	1862
Geiger, Conrad John,	Canton, O.,	1866	1876
Gerhard, John C.,	Cincinnati, O.,	1862	1865
Geyer, Andrew,	Boston, Mass.,	1853	1855
Gilman, Samuel Kinsman, Jr.,	Boston, Mass.,	1876	1879
Gleeson, James Andrew,	Boston, Mass.,	1859	1880
Gleeson, Michael Henry,	Boston, Mass.,	1859	1879
Goodwin, William W.,	Newburyport, Mass.,	1853	1877
Graefle, Frederick Alexander,	Baltimore, Md.,	1870	1873
Green, Thomas Townsend,	Poughkeepsie, N. Y.,	1858	1880
Griswold, William Henry,	North Adams, Mass.,	1874	1879
Groneweg, Louis,	Cincinnati, O.,	1864	1866
Haddox, James Bowling,	Nashville, Tenn.,	1876	1880
Harbaugh, Valentine,	Washington, D. C.,	1856	1871
Hazard, Peter J.,	Philadelphia, Pa.,	1853	1876
Hegeman, Frederick Augustus,	New York,	1855	1860
Hegeman, William,	New York,	1858	1875
Henchman, Daniel,	Boston, Mass.,	1853	1878
Hensch, Hugo,	Cleveland, O.,	1872	1873
Hendel, Samuel Douglass,	St. Louis, Mo.,	1858	1871
Heydenreich, Frederick Victor,	Brooklyn, N. Y.,	1860	1879
Heyerdahl, Ulrich,	Faribault, Minn.,	1880	1882
Hill, Henry E.,	Detroit, Mich.,	1866	1868
Hollis, Thomas,	Boston, Mass.,	1853	1875
Hoagland, Pratt Ralph,	Boston, Mass.,	1867	1882
Homann, James W.,	New York,	1875	1875
Howard, George Montgomerie,	Washington, D. C.,	1871	1877
Howarth, James L.,	Atlanta, Ga.	1877	1881
Hughes, Henry Arnold,	Louisville, Ky.,	1857	1876
Hunt, Henry H.,	Balston Spa, N. Y.,	1876	1877
James, Thomas Potts,	Cambridge, Mass.,	1857	1882
Jardella, Jerome B.,	Vincennes, Ind.,	1865	1870
Jenkins, William Ellis,	Boston, Mass.,	1865	1869
John, Frederick L.,	Philadelphia, Pa.,	1856	1864
Johnston, Charles Pearson,	Memphis, Tenn.,	1868	1873
Junghanns, Charles A.,	Cincinnati, O.,	1858	1862
Keffer, Frederick A.,	New Orleans, La.,	1862	1873
Kennedy, Robert Chauncey,	Cleveland, O.,	1865	1868
Kent, Ashbury,	Cincinnati, O.,	1854	1860
Kent, William,	Cincinnati, O.,	1864	1867
Kettell, George Parker,	Charlestown, Mass.,	1867	1881
Kidder, Darius B.,	Boston, Mass.,	1858	1874
Kiersted, Henry Taylor (Pres. 1860–'62),	New York,	1856	1882
King, Alexander,	Buffalo, N. Y.	1874	1876
King, Henry,	New York,	1858	1867
Knapp, Edwin Ezra,	Norwalk, Conn.,	1860	1862

		Elected.	Died.
Kolp, Christopher Henry,	Philadelphia, Pa.,	1876	1878
Krebs, Hugo,	St. Louis, Mo.,	1871	1880
Krummeck, Jacob,	Santa Fe, New Mexico,	1867	1878
Laidley, Joseph,	Richmond, Va.,	1852	1861
Lancaster, Thomas A.,	Philadelphia, Pa.,	1859	1875
Lane, Alfred Samuel,	Rochester, N. Y.,	1857	1881
Lane, James Bacheller,	Fitchburg, Mass.,	1856	1867
Leitch, Alexander,	St Louis, Mo.,	1858	1868
Lewis, Thomas,	Brooklyn, N. Y.,	1867	1880
Lineaweaver, Kline Cyrus,	Washington, D. C.,	1864	1873
Lingelbach, Ferdinand,	Louisville, Ky.,	1874	1879
Little, William B.,	Panama, U. S. Colombia,	1857	1867
Longshaw, William, Jr,	Bayou Sara, La.,	1858	1864
Lyman, Benjamin,	Montreal, Can.,	1875	1878
Lyman, Stephen J.,	Montreal, Can.,	1875	1879
Lyon, Charles H., Jr.,	Boston, Mass.,	1858	1871
McBride, James,	St. Louis, Mo.,	1864	1871
McConville, Michael Stanislaus,	Worcester, Mass.,	1859	1873
McDonald, John,	Brooklyn, N. Y.,	1860	1861
McIntyre, Timothy Caldwell,	Washington, D. C.,	1858	1862
McKay, George Johnson,	Eureka, Cal.,	1864	1880
McPherson, George B.,	Cincinnati, O.,	1867	1871
Mallinckrodt, Gustavus,	St. Louis, Mo.,	1869	1877
Massott, Eugene Leon,	St. Louis, Mo.,	1857	1871
Matt, Joseph,	Columbus, O.,	1872	1874
Mattern, Jonathan Cunningham,	Pittsburgh, Pa.,	1860	1876
Maxwell, James T.,	New York,	1855	1860
Mayer, Ferdinand F.,	New York,	1859	1869
Meade, Richard Hardaway,	Richmond, Va.,	1873	1880
Meakim, John (Pres. 1855–56),	New York,	1852	1863
Melzar, Augustus P.,	Wakefield, Mass.,	1856	1874
Menard, Alexander Ambrose,	Macon, Ga.,	1877	1881
Merrick, John Mudge,	Boston, Mass.,	1875	1879
Metcalf, Tristam Walker,	Brooklyn, N. Y.,	1857	1873
Milhau, John (Pres. 1867–68),	New York,	1855	1874
Muller, William Henry,	Chicago, Ill.,	1865	1870
Mundy, William Chester,	Seneca Falls, N. Y.,	1880	1881
Nagle, John George,	Baltimore, Md.,	1863	1869
Nairn, Joseph Wilson,	Washington, D. C.,	1858	1875
Nadand, James William,	Cincinnati, O.,	1864	1868
Neate, William Isaac Collier,	Olympia, W. T.,	1880	1881
Neergaard, John William,	New York,	1859	1880
Norgrave, Samuel Kramer,	Pittsburgh, Pa.,	1857	1871
O'Brien, Joseph Christopher,	Baltimore, Md.,	1863	1873
O'Gallagher, James,	St. Louis, Mo.,	1858	1882
Oliffe, William J.,	New York,	1858	1866
Osborn, William Henry,	Baltimore, Md.,	1870	1881
Osgood, Samuel W.,	Davenport, Iowa,	1858	1860
Palmer, Albert Gallatin,	Washington, D. C.,	1858	1860
Parker, Herschel,	Brooklyn, N. Y.,	1867	1870

		Elected	Died.
Parrish, Edward (Pres. 1868–69),	Philadelphia, Pa.,	1852	1872
Patten, John Frederick,	Bangor, Me.,	1871	1881
Peck, Sereno Parsons,	Bennington, Vt.,	1853	1859
Pettis, Newton C.,	North Adams, Mass.,	1868	1874
Philbrick, Samuel P.,	Boston, Mass.,	1852	1859
Phillips, Lewellyn,	Baltimore, Md.,	1856	1865
Pile, Wilson Hunt,	Philadelphia, Pa..	1857	1881
Platzer, Robert,	Philadelphia, Pa.,	1865	1874
Plummer, George Bolton,	Hinsdale, Mass.,	1875	1882
Polhemus, James L.,	Sacramento, Cal.,	1866	1867
Pollard, Charles P.,	Marysville, Cal.,	1859	1869
Porter, Henry Clinton,	Towanda, Pa.,	1869	1877
Preston, Alfred, Jr.,	Portland, Me.,	1873	1879
Procter, William, Jr. (Pres. 1862–63),	Philadelphia, Pa.,	1852	1874
Pyle, James Lindley,	Brooklyn, N. Y.,	1859	1866
Rehfuss, Lewis,	Cincinnati, O.,	1854	1856
Reifsnider, William Edward,	Baltimore, Md.,	1864	1872
Reinold, Bernard H.,	New York city,	1861	1876
Ricker, George Dexter,	Boston, Mass.,	1858	1881
Rideout, James William,	Brooklyn, N. Y.,	1875	1880
Ritson, Alfred,	Columbus, O.,	1870	1879
Roberts, David,	Boston, Mass.,	1858	1863
Rollmann, Frederick,	Philadelphia, Pa.,	1862	1864
Roemer, Daniel,	Cincinnati, O.,	1865	1870
Ross, George,	Lebanon, Pa.,	1878	1880
Sands, Jesse M.,	New York city,	1860	1867
Schmidt, Henry,	New York city,	1874	1875
Schmidt, William George,	Louisville, Ky.,	1874	1877
Scott, David,	Worcester, Mass.,	1855	1878
Scott, John,	Cincinnati, O.,	1854	1873
Scully, Harmar Denny,	Pittsburgh, Pa.,	1858	1866
Selfridge, Matthew Merthirall,	Philadelphia, Pa.,	1858	1881
Shoemaker, Joseph Lybrand,	Philadelphia, Pa.,	1867	1880
Smith, Charles Augustus,	Cincinnati, O.,	1852	1862
Smith, Edward Alexander,	Baltimore, Md.,	1870	1875
Smith, Edwin R.,	Monmouth, Ill.,	1862	1869
Smith, John William,	Norfolk, Va.,	1873	1876
Smith, Samuel A.,	Newburyport, Mass.,	1859	1874
Smither, Charles,	Buffalo,	1881	1882
Snowdon, George M.,	Philadelphia, Pa.,	1857	1879
Squire, William Henry,	Germantown, Pa.,	1862	1865
Stabler, Rich. Hartshorne (Pres. 1870–71),	Alexandria, Va.,	1856	1878
Steiner, Henry,	Philadelphia, Pa.,	1857	1858
Stephens, William Gibson,	Yonkers, N. Y.,	1860	1878
Stevens, Ashbel Mead,	Cincinnati, O.,	1854	1860
Stevens, Rufus Walker,	Somersworth, N. H.,	1859	1868
Suding, Henry Aloysius,	Baltimore, Md.,	1870	1875
Sweetser, Thomas Augustus,	South Danvers, Mass.,	1859	1860
Talbot, Stephen Liverridge,	Providence, R. I.,	1882	1883
Taylor, Robert James,	Newport, R. I.,	1859	1871

		Elected.	Died.
Taylor, William,	Philadelphia, Pa.,	1868	1871
Thayer, Henry,	Cambridgeport, Mass.,	1858	1882
Thomas, William,	Jersey City, N. J.,	1856	1856
Toplis, Robert John,	Yonkers, N. Y.,	1863	1882
Tulley, Andrew J.,	New York city,	1862	1875
Uhl, Charles,	Memphis, Tenn.,	1860	1873
Waite, Samuel Brett,	Washington, D. C.,	1858	1862
Warren, Charles Henry,	Brandon, Vt.,	1872	1876
Warren, William,	Brighton, Mass.,	1867	1871
Watson, William J.,	Brooklyn, N. Y.,	1853	1872
Weaver, James,	New York city,	1860	1883
Weaver, Joseph Thornton,	Philadelphia, Pa.,	1868	1882
Weyman, George Washington,	Pittsburgh, Pa.,	1858	1864
White, Daniel Fuller,	Charlestown, Mass.,	1859	1864
White, William P.,	Chicago, Ill.,	1865	1866
Whitehead, Silas,	Lynchburg, Va.,	1856	1858
Wilkins, Daniel Gilbert,	Boston, Mass.,	1865	1880
Willard, Joseph,	Chicago, Ill.,	1865	1878
Wilson, Adam Hill,	Philadelphia, Pa.,	1859	1880
Wilson, George C.,	Boston, Mass.,	1859	1861
Wiseman, Charles,	Baltimore, Md.,	1856	1862
Witzell, Louis,	Cincinnati, O.,	1864	1867
Wood, Gilbert Davidge,	Baltimore, Md.,	1856	1863
Woods, Samuel H.,	Boston, Mass.,	1859	1869
Wright, George,	New York city,	1869	1873
Young, John Edward,	Vergennes, Vt.,	1875	1882

LIST OF RESIGNATIONS.

Name.	Residence.	Elected.
†Barthels, Joseph,	Indianapolis, Ind.,	1879
§Eaton, Charles I.,	Boston, Mass.,	1867
†Fell, Theron E.,	Bloomington, Ill.,	1880
‡Fredigke, Charles C.,	Chicago, Ill.,	1869
§Gordon, Edward B.,	Lynn, Mass.,	1875
†Hill, Alfred C.,	Cincinnati, O.,	1864
‖Lippert, Otto C. F.,	Cincinnati, O.,	1880
‖Needles, Caleb H.,	Philadelphia, Pa.,	1867

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† Left the business.

‡ Inability to attend the meetings.

‖ Ill-health.

§ No reason given.

LIST OF MEMBERS DROPPED FROM THE ROLL.

Name.	Residence.	Elected.
Abell, Walter B.,	Philadelphia,	1867
Avery, Archibald,	Atlanta, Ga.,	1878
Bang, Charles,	St. Louis, Mo.,	1871
Barnaby, James O.,	Brooklyn, N. Y.,	1870
Biddle, Charles J.,	Philadelphia,	1875
Bossler, David J.,	Philadelphia,	1873
Button, Elijah,	Annapolis, Md.,	1870
Craig, John S.,	Boston, Mass.,	1875
Daniels, John B.,	Atlanta, Ga.,	1871
Donavin, Matthew W.,	Baltimore, Md.,	1867
Fairbanks, Harlan,	Rochester, N. Y.,	1876
Fale, John,	Hawkinsville. Ga.,	1877
Finney, Thomas J.,	Harrisburg, Pa.,	1874
Finger, Henry J.,	Santa Barbara, Cal.,	1878
Foltz, William K.,	Akron, O.,	1872
Greene, Charles H.,	Atlanta, Ga.,	1878
Hall, Roland B.,	Macon, Ga.,	1877
Hoffeld, Alfred H.,	New Albany, Ind.,	1879
Hooper, John H.,	Chicago, Ill.,	1865
Howarth, John W.,	Utica, N. Y.,	1874
Hubachet, Joseph H.,	Rochester, N. Y.,	1880
Keeshan, John,	Cincinnati, O.,	1864
Lippincott, Henry B.,	Philadelphia,	1868
Lyman, Cornelius M.,	Buffalo, N. Y.,	1879
Magill, Benjamin M.,	Philadelphia,	1876
Massey, George,	New York city,	1877
Merrill, Walter S.,	Danvers, Mass.,	1875
Peacock, Frederick S.,	Atlanta, Ga.,	1871
Perry, Joseph R.,	Indianapolis, Ind.,	1879
Pinson, John L.,	Atlanta, Ga.,	1878
Scholz, Philip,	St. Louis, Mo.,	1871
Scott, Albert A.,	Richmond, Va.,	1873
Tarrant, Homer P.,	Newberry Court House, S. C.,	1875
Taylor, Walter A.,	Atlanta, Ga.,	1876
Timberlake, Arthur,	Indianapolis. Ind.,	1879
Vogelbach, Herman A.,	Philadelphia,	1868
Warrington, Charles W.,	Philadelphia,	1876

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